MODEL AIRPLANE NEWS

MAY 1943 • 20 CENTS

DOUGLAS "DAUNTLESS"

(See page 23)

EXPLANATION TO MODEL BUILDERS:

Why - temporarily - we are shipping

UNDECORATED TUBES

to speed deliveries on orders for

TESTORS 5¢ MODEL AIRPLANE CEMENT

LOOK FOR THE NAME...
TESTOR'S ON THE SHOULDER OF EVERY TUBE!

Very frankly, we are literally "snowed under" by a record-breaking volume of orders for Testor's Model Airplane Cement! Bottleneck of production has been the process of decorating the tubes . . . lithographing them in their brilliant red, yellow, and blue design. Therefore: to speed production and to speed deliveries . . . we have decided to ship *undecorated* tubes to dealers until our backlog of orders is substantially reduced. You can buy these plain tubes with perfect confidence. *Just remember to look for the name TESTOR'S on the shoulder as illustrated above.* It's your positive guarantee of the identical cement you have always found in the familiar Testor package!

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We are in a hard war . . . IF YOU ARE 16 or 17 . . . you have the opportunity of a lifetime. Help your country to VICTORY and at the same time TRAIN yourself for a CAREER in Aviation. See Curtiss-Wright Technical Institute ad on page 3—MAIL COUPON TODAY and include your birth date, for vital information.

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Most replacement parts are still available at the original prices. A parts list will be sent upon request. Since you have this excellent engine, keep it in good condition for the duration.

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FLASH NEWS

ADD another bulls-eye to the Air Power vs. Sea Power contest: The Battle of the Bismarck Sea in which landbased Fortresses of General MacArthur completely annihilated a Japanese task force of ten warships (cruisers and destroyers) and twelve troop transports carrying a total of 15,000 men and, in addition, some 80 planes protecting the convoy. In this action the United States lost only one bomber and three fighter planes and not a single surface vessel of our fleet took part in the engagement: it was an air victory in every sense of the word and compares favorably with the glorious victory at Midway. Official spokesmen have said (of the Bismarck Sea holocaust): "This opens the road to Tokio!"

Some facts and figures: The present backlog of the aviation industry is $20,000,000,000! This makes it the largest industry in the entire United States, second to none! By the end of this year it is believed that 1,000,000 employees will be engaged in turning out airplanes, from tiny primary trainers to huge multi-motored bombers, but between 400,000 and 450,000 of these will be women! In 1943, Major Nathaniel Silsbee estimates that a total evaluation of some $11,000,000,000 worth of airplanes will be built in the 75,000,000 square feet of the nation's aircraft factories, which means between 85,000 and 90,000 airplanes!

A bill which would set up a Secretary for Air and another which would establish a committee for purposes of studying post-war aviation problems has been definitely killed in Congress. Commentators state that reasons for the move are unpopularity of this nation's post-war aviation plans to the British Parliament, which has been showing great concern over the broad scope of Uncle Sam's planning for a flying future. The Capitol in Washington has been aviation's greatest foe since December 17th, 1903. Check your history for the past forty years!

Major Lewin Barringer has been reported missing in action on a flight in an Army bomber over the Caribbean. Lew was formerly president of the Soaring Society of America and was chief of the Army's glider production and training program. He was the nation's outstanding authority on gliders, and his life, lost with Colonel Walter Sumpter Smith, leaves gliding without a long, staunch friend.

During last year the Royal Air Force lost only 1,337 homebased aircraft in raids over Europe, it has been announced by the British Information Services quoting a speech by Sir Archibald Sinclair, Secretary of State for Air (England).

During 1942 the Army Air Forces destroyed a total of 1,349 enemy aircraft with a loss of only 309 planes, or better than three enemy planes to our one! Oddly enough our bombers accounted for 480 E.A. with a loss of 110 to themselves, while our fighters accounted for only 294 E.A. with a loss to themselves of 164! Miscellaneous types shot down 213 E.A. with a loss to themselves of 35 planes.

Consolidated will soon be in production on the PB4Y-1 patrol bomber, according to Rear Admiral Ralph E. Davison, Assistant Chief of the Bureau of Aeronautics. Modeled after the Consolidated Model 31 (MODEL AIRPLANE NEWS, September 1939 issue) the twin-engine seaplane will be the fastest of its type ever designed and will feature nose and tail turrets. Its great speed is gained through use of the fabulous Davis wing (MODEL AIRPLANE NEWS, September 1940 issue). The plane is to be built in the giant Louisiana plant turned over to Consolidated by the Navy from Nash-Kelvinator, which was originally scheduled to build the Sikorsky XPBS four-motored flying-boat, now cancelled.

Republic Aviation has completed its "ice-box!" The three-room test chamber is capable of reproducing aerial conditions to a temperature of 92 degrees below zero and the equipment cost $45,000. It will enable Republic to test various items of equipment used on the famed Thunderbolt (MODEL AIRPLANE NEWS, December 1942 issue) fighter for high-altitude work.

One of the strangest true stories of the war can now be told: On February 9th, 1943, a four-motor Consolidated C-87, cargo version of the famed Liberator, took off from Florida on a routine flight to South America with a full load of cargo, a crew of six and two passengers. The plane was out 1-1/2 hours when one of the passengers, Lieut. C. K. Knutson, noticed a flutter in the tail and notified the pilot, Lieut. R. C. Ulmer, who turned the ship around and headed back. After losing altitude from 9,000 to 5,300 feet the crew began to throw the cargo overboard. When Ulmer thought they were over land again he ordered everyone to jump, turned the airplane back out to sea, set the automatic pilot and bailed out. The Coast Guard rescued all the crew and passengers. The next day the bomber crashed in Northern Mexico, 3,000 miles away!

Alvino Rey, popular guitarist, and his famed orchestra have given up music for the duration in favor of producing Flying Fortress bombers at Vega Aircraft in Burbank, California. They have traded a collective income of $10,000 per week in favor of beginner's wages totalling some $800.

Fan No. 1 of Major General Ira C. Eaker, commanding officer of Army Air

(Continued on page 31)

14TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

MAY, 1943 VOL. XXVIII, No. 5

CONTENTS

FEATURE

Submarine Smashers..... 6

RUBBER POWERED

Build This Flying "Jeep".....16

"Thermo" Contest Winner....24

THREE VIEW

Douglas Dauntless.....22

STRUCTURAL VIEW

Douglas A-20..... 8

SCIENCE

Tips on Tips..... 9

Modeling Your Future in Aviation 10

Airplane Design Forum.....27

Stressing Your Gas Job.....30

PLANE ON THE COVER

Devil Diver.....23

NEWS

Flash News..... 2

Frontiers 14

Sky Scouts.....21

Air Ways.....28

Air Youth.....34

Edited by
Charles Hampson Grant

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"BOTH BARRELS AT ONCE"

Conscription includes everyone 18 years old or over. Closing of enlistments has put a stop to choosing service. You will now be assigned. YOUR BEST CHANCE IN AVIATION NOW IS TO TRAIN FOR IT . . . making yourself the kind of man the Air Forces want; the kind they can't do without. If you are thoroughly trained you will advance rapidly in the Army Air Forces or in Civilian aviation.

Curtiss-Wright Technical Institute is training hundreds of civilians in aviation mechanics and aeronautical engineering. These men will be definitely qualified for their place in aviation, either military or civil.

By enrolling at Curtiss-Wright Tec now, you have an enviable opportunity to guide your own future. HIT THE BULL'S EYE WITH BOTH BARRELS AT ONCE . . . one for your war service, the other for your after-the-war career in aviation.

The executives who have made aviation THEIR career know the value of each man is governed by two factors: his intelligent sincerity in selecting aviation as his life work, and THE ABILITY AND EXPERIENCE OF THOSE WHO TRAIN HIM FOR THAT CAREER. They know that Curtiss-Wright Technical Institute graduates are—and for many years have been—thoroughly qualified to fill the industry's requirements.

Located in the very center and a very important part of Southern California's great aircraft industry, with its more than two billion dollars in unfilled orders, Curtiss-Wright Tec has come to be recognized as the nation's leading institution for the training of Aeronautical Engineers and Master Mechanics.

Mr. Donald Douglas, President of the great Douglas Aircraft Company, chose this school for his own son's training, which pointedly indicates the high standing Curtiss-Wright Tec has attained in the aircraft industry since its establishment in 1929.

It is imperative that before you invest in a course of career training you determine what the returns will be on your investment . . . for your choice of a school in which to take your training will determine how much money you will make the rest of your life.

Curtiss-Wright Tec's career training is carefully designed to do just one thing:—TO MAKE MONEY FOR YOU, so upon graduation you can be independent and self-supporting for life. Our thousands of successful graduates have proven. Curtiss-Wright Tec training gets results and always pays, since it trained them in advance for the highest position they could ever expect to occupy. It can do the same for you.

This school has never guaranteed positions for its graduates, but practically every graduate has obtained immediate employment and is advancing rapidly. The demand for our graduates far exceeds the supply, and we honestly believe every student who enrolls here will be able to obtain, with our assistance, immediate employment upon graduation.

WARNING!—"Don't miss the boat." The greatest opportunity in your lifetime exists today! There never was such an opportunity in aviation for you; there may never be another. A position awaits you. Insure for yourself a steady income and independence for life. DON'T FOLLOW—LEAD! Send in your enrollment before you "miss the boat."

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AERONAUTICAL ENGINEERING & MASTER MECHANICS

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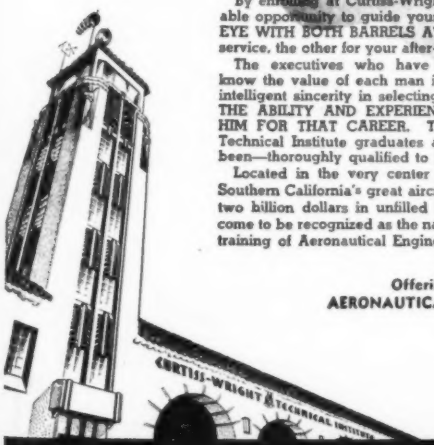

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NAME

ADDRESS

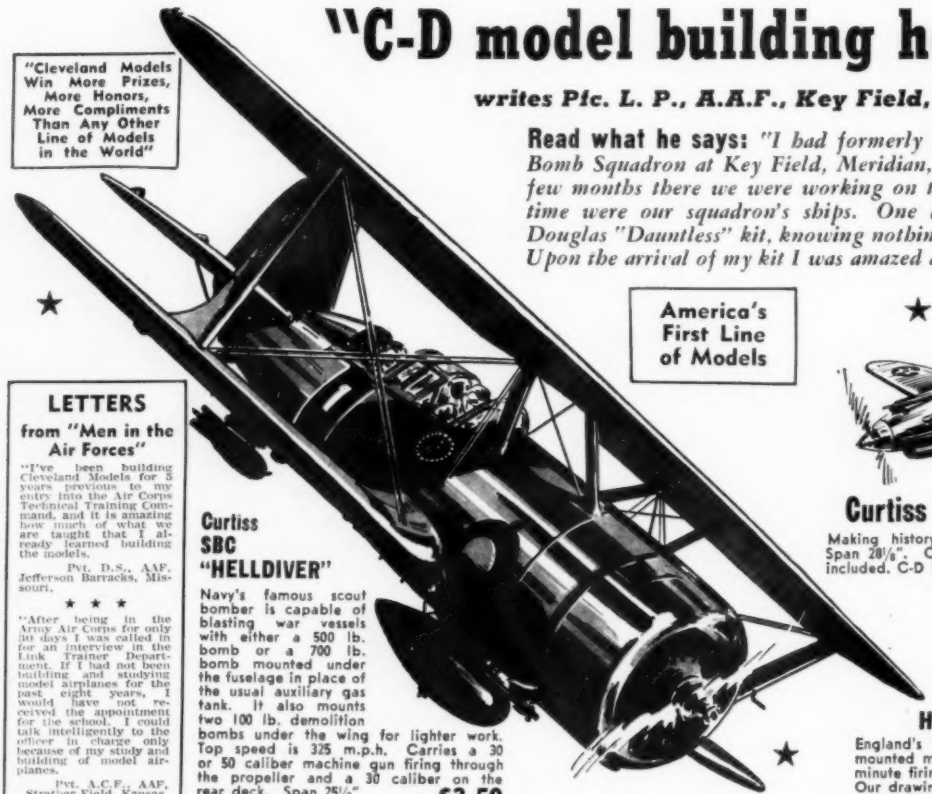
CITY STATE N-5

"C-D model building helped me,

writes Pfc. L. P., A.A.F., Key Field, Mississippi

Read what he says: *"I had formerly been attached to the 88th Bomb Squadron at Key Field, Meridian, Mississippi. For the first few months there we were working on the A-20C's, which at that time were our squadron's ships. One day I sent for your C-D Douglas "Dauntless" kit, knowing nothing of this ship at that time. Upon the arrival of my kit I was amazed at the beauty* (Cont. next page)

"Cleveland Models Win More Prizes, More Honors, More Compliments Than Any Other Line of Models in the World"



America's First Line of Models

LETTERS
from "Men in the Air Forces"

"I've been building Cleveland Models for 8 years previous to my entry into the Air Corps Technical Training Command, and it is amazing how much of what we are taught that I already learned building the models.

Pvt. D.S., AAF, Jefferson Barracks, Missouri.

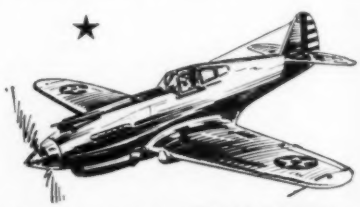
★ ★ ★

"After being in the Army Air Corps for only 30 days I was called in for an interview in the Link Trainer Department. If I had not been building and studying model airplanes for the past eight years, I would have not received the appointment for the school. I could talk intelligently to the officer in charge only because of my study and building of model airplanes.

Pvt. A.C.F., AAF, Strather Field, Kansas.

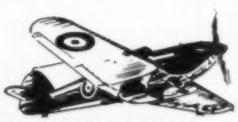
Curtiss SBC "HELLDIVER"

Navy's famous scout bomber is capable of blasting war vessels with either a 500 lb. bomb or a 700 lb. bomb mounted under the fuselage in place of the usual auxiliary gas tank. It also mounts two 100 lb. demolition bombs under the wing for lighter work. Top speed is 325 m.p.h. Carries a 30 or 50 caliber machine gun firing through the propeller and a 30 caliber on the rear deck. Span 25½" C-D Master kit SF-80 **$3.50**



Curtiss P-40 "TOMAHAWK"

Making history everywhere it takes to the air. Span 28⅛". Camouflage Instructions included. C-D Master Kit SF-77 **$3.00**



Hawker "HURRICANE"

England's great night fighter. Employs 8 mounted machine guns with 10,000 rounds per minute firing power—or four 20 m.m. cannons. Our drawings show both types; also air scoop employed in African desert fighting. Model Span is 30". C-D Master Kit SF-78 **$3.00**

Grumman F4F "WILDCAT"

An excellent U.S. Navy Shipboard and Marine fighter. Lives up to its name—in the case, for instance, where one of our men downed 5 Jap bombers in 5 minutes. Very maneuverable. Has a speed of 325 m.p.h. Model Span is 26¼". C-D Master Kit SF-83 **$3.00**

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British "SPITFIRE"

Pride of the R.A.F. Fast, maneuverable and a deadly interceptor-fighter. Span is 27⅝". C-D Master Kit SF-73 **$3.00**

Nazi DIVE BOMBER JUNKERS JU-87 STUKA

One of the Nazis' greatest weapons for terrorizing and wreaking heavy destruction upon Europe. Span is 34". C-D Master Kit SF-84 **$3.50**

LETTERS
(Continued)

"I am an instructor in the Air Corps Technical School here and want you to know how much your models have helped both my students and myself. They have cleared up many small details such as design and structural features. I have just finished your 'North American Mustang' and it is now on display in our branch office and it is to be used for instruction purposes. The knowledge gained from building C-D models has helped me immeasurably in my work."

CPL. J.B.D., AAF, Keesler Field, Miss.

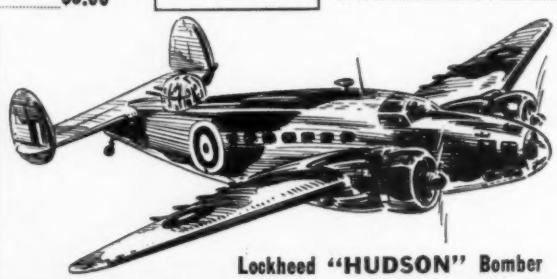
★ ★ ★

"I am now a pilot in the R.C.A.F., having been in this service for almost a year and a half. During this time I've come to realize the value of my eight years of model building. They have helped me exceedingly in my training as a pilot—taught me the principles of flight, construction, recognition—in fact, I owe something like 20% of my passing marks to model building.

F/O J. O'C., RCAF, Montreal, Can.

★ ★ ★

"I'm in the Signal Corps teaching Air Corps men to be radio operators. Due to my knowledge of aircraft, acquired from modeling experience, I am able to put over aircraft sets and (Continued on next page)



Lockheed "HUDSON" Bomber

Called "Old Boomerang" by the British, for it always seems to come back. A powerful bomber, also used for reconnaissance and has done some fighting, too. Has seen plenty of action over Europe, Africa and the wide stretches of the Pacific. Span is 49⅜". C-D Master Kit SF-95 **$7.50**

North American P-51 "MUSTANG"

A tough vicious fighter that is today very much in the news. Known as the P-51 "Apache," rechristened "Mustang" by the British. Flies over 350 m.p.h. Span 27 3/16". C-D Master Kit SF-91 **$3**

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Stronger, longer flights, more graceful lines, construction simplified. Easier than ever to build. Huge 7 ft. wingspan. You can't get a better design for learning principles of advanced soaring flight. Kit VE-5019 **$1.00**

The Big Improved EAGLET Glider

Longer lasting. Beautiful flights. Big 4 ft. wingspan. Patterned after "Baby Bowlus." Easily Built. Kit VE-5018 **50¢**

When You Build CLEVELAND

that Pilots, Bombardiers, Instructors, Cadets-in-Training

and also surprised my crew chief"

and detail of the plans. It took 3 weeks of spare time to build that swell ship and as a reward I received word that our squadron was to be supplied with Douglas A-24's (Army Designation). Upon arrival of these ships, I was told to study this ship very carefully and familiarize myself with it. Imagine my crew chief's surprise when I began to pour out information about the A-24. He immediately asked how I knew so much about this ship when I had never been near one until this day. I explained about my previous experience with C-D model building, telling of the World War I models I had built years ago and also showing him my newly completed A-24 model. He was so impressed that I was recommended for P.f.c. rating."

Bell P-39 "AIRACOBRA"

The swift flying "cannon plane" that stings with the deadliness of a cobra. Doing great work over the Solomons. Model has beautiful streamline grace of prototype and cuts through the air with a knifelike flight. Span is 25½". C-D Master Kit SF-76 ..... **$3.00**

LOCKHEED P-38 "LIGHTNING"

A super powered, twin motored job, so fast that you don't hear it till it has passed. Ideal for intercepting bombers because of its high ceiling, and terrific diving power. Span 38¾". C-D Master Kit SF-85 ..... **$4.00**

DOUGLAS SBD "DAUNTLESS"

The famous carrier dive bomber or scout widely employed by the U.S. Navy and Marine Corps. Known as the A-24 in the Army. World's hardest hitting dive bomber. Span 30⅛". C-D Master Kit SF-89 ..... **$3.50**

Republic P-47 "THUNDERBOLT"

The "Flying Battleship" with tremendous fire power. A speed of over 425 m.p.h. and a 40,000 ft. ceiling. One of our greatest fighters. Span is 30¾". C-D Master Kit SF-81 ..... **$4.00**

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T74-Messerschmitt ME-109

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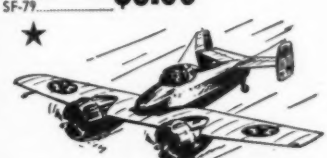
Brewster "BUFFALO"

Highly maneuverable and fast. Climbs 4,000 ft. per minute. Speeds around 350 m.p.h. Has exceptional cruising range. Also used by British and Dutch. Former nicknamed it "Peanut Special." Span 26¼". C-D Master Kit SF-87 ..... **$3.00**



Grumman "SKYROCKET"

America's twin motor 450-mile-per-hour "Terror of the Skies." It's spectacular! It's the envy of every model builder. Both motors pull—and how. Span 31½" C-D Master Kit SF-75 ..... **$3.50**

Messerschmitt ME-109

Germany's mass production fighter. In action wherever Nazis are fighting. Model Span is 24½". C-D Master Kit SF-74 ..... **$3.00**

Ordering Instructions: See *your dealer first.* If he can't supply you, send check or m.o. (cash at own risk). No C.O.D.'s. Postal restrictions now prohibit shipments outside U.S. except to Canada and Mexico (to which 10% must be added). For service men still stationed in U.S.: restrictions prevent our shipping to A.P.O. or Fleet P.O. box numbers—so, use a local nearby address if possible. Special Delivery 25c extra (U.S. only). Ohio residents add 3% sales tax. All Kit contents and prices subject to change or cancellation without notice. The usual C-D "Lightning Service" guaranteed—no delays.

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MODELS *You're Building Models*

and Mechanics of all classes in the Air Forces Build

LETTERS

from "Men in the Air Forces"

(Continued)

operations in the Air Corps boys' own language. It has helped me in many ways.

Corp. M.L., U.S.A.
Sacramento, Calif.

★ ★ ★

"When I became of age my thoughts of enlisting naturally turned to the R.C.A.F. I can truthfully say that my experience in designing and building model aircraft has helped me 100% in my trade, as a Flight Rigger.

R.S.S., RCAF.
Allliford Bay, B.C.

★ ★ ★

"My experience with models greatly increased my class average during my Navy training course for aircraft mechanic and was greatly responsible for winning my aviation rating.

J. D. G., USNR.
Jacksonville, Fla.

★ ★ ★

"I was a student glider pilot and going like a ball of fire till one of my ears went haywire. Now I am building models here for the Gunnery school, to be used in the aircraft Recognition classes. Last week I presented the C.O. with a

(Continued below)

LETTERS

(Continued)

finished C-D model of the P-40. He liked it so well and looking into my situation arranged that I will be able to take an operation shortly on my ear, if successful, I'll be flying again in six months. That C-D Kit sure scored another victory, as they did in the past.

J.H.A., AAF.
Kingman, Ariz.

★ ★ ★

"I am at present an instructor in Photography School, where I have taught Aircraft Identification for some time. It was entirely due to my model building experience, which dates back to 1928, that I was able to qualify as an instructor in this field.

Sgt. R.C.M., AAF.
Lowry Field, Colo.

★ ★ ★

"I have built your models on many occasions when they were available in England before the war, and I can honestly say that they have helped me enormously to understand the aerodynamical effects of the various control surfaces on the full size aircraft in which I am training now. I take your model of the 'Spitfire' to be a tribute to the actual machine, both in flying and looks.

F.T.W., RAF.
Moncton, N.B.

SUBMARINE SMASHERS

Behind the scenes with the Bomber Command's Anti-Submarine Command

by **CHARLES EWING**

"UNTIL we have won the Battle of the Atlantic, we cannot hope to win the Battle of Europe!" This, in various phrasing, is the pronouncement of President Roosevelt, Admiral King and General Arnold, as well as Prime Minister Churchill. And the Battle of the Atlantic has narrowed itself to a contest between American Air Power and Germany's U-Boat fleet, a see-saw battle of wits, skill and courage with no quarter being given or taken by either side.

We have told you of the various other weapons being used against the vicious "Unterseeboot" (MODEL AIRPLANE NEWS, December 1942 issue) including Civil Air Patrol lightplanes, blimps, PT boats, flying-boats, etc.

But, in the final analysis, it is the Army Air Forces' fast, deadly medium bombers, admittedly the best in the world, which carry the brunt of the task to the enemy.

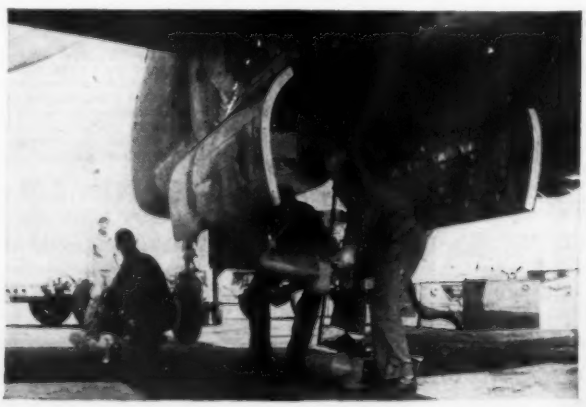
To successfully operate an anti-submarine patrol requires management and planning rivalling that of a giant industrial concern; requires, too, skill and knowledge closely akin to scientific research, for every Air Force officer and enlisted man engaged in this perilous undertaking is a specialist who is master of his trade.

The work of the Anti-Submarine Command divides itself into many phases; tactical planning, flying, service and maintenance, training, supply, command, repair, accounts, dispensations, hospitalization, medical, signaling, liaison, etc., each of which must work in smooth, efficient harmony with each other. And the basic element in this integrated team is the airplane, about which every plan, skill and action revolves. Uncle Sam has developed a famed trio of medium bombers with which those of no other nation can compare.

Possibly the outstanding plane of this type is the Martin B-26 Marauder (MODEL AIRPLANE NEWS, March 1941 issue), the world's fastest medium bomber which has done such valiant work in the South Pacific. The Marauder, however, has been assigned the difficult task of torpedo attack work, special racks having been fitted for the purpose and the type has been devoted almost exclusively to anti-warship and enemy shipping tactics. The Douglas A-20 types, used in the Royal Air Force as the Boston bomber and the Havoc night fighter, has been in service for more than three years throughout the world and has been used on every conceivable type of mission. Because of its flexibility it can rarely be spared for anti-submarine work and is used in vital low-level sorties over Nazi-held countries in the lowlands of Europe.

The third type, and the one selected by the Bomber Command for its anti-submarine patrol, is the North American B-25 Mitchell (MODEL AIRPLANE NEWS, August 1942 issue) chosen because of its great

Above **A B-25 Mitchell with a load of bombs warms up for a submarine hunt.** *Below left* **The bombardier in his glass house is ready for action.** *Below right* **Trips are attached and then bombs are hoisted into the racks**



Right **The eight groundmen that keep this bomber in the air are specialists.** *Second from top* **An A-20 attack bomber waits for its load of bombs and depth charges.** *Third* **The bomber crew hurries to their plane on an alert signal**

All photos by Kulick

bomb-load capacity. The latest version of this plane, famed for its highly successful raid on Tokyo, is known as the B-25 and varies from earlier models in the use of both upper and lower multi-gun power-driven turrets. In the ship is a lookout station from which photographs of bomb damage are taken for record and confirmation purposes. The ship carries over a ton of bombs, a crew of five and has a top speed of better than 300 mph and a range of more than 1,700 miles. This, then, is the instrument, so delicate and fine that it requires the constant attention of eight men to keep it in fighting trim.

The day's activities at a typical Anti-Submarine Command Base, somewhere along the Atlantic Coast, begins at 5 A.M. at which time the technicians arise, dress and eat. By 6 A.M. the planes are rolled out on the line (planes are never serviced with fuel and oil or their radio equipment tested while *inside* a hangar) and the routine inspection and check is begun. Each man is a specialist with the exception of the Flight Chief, who is in charge of the crew and a master of all the various components and items of equipment in the Mitchell bomber. Very likely he has been trained in North American's own Army school maintained at the plant in Inglewood, California and has been in charge of his airplane since it left the factory!

The other seven men are specialists in armament, engines, radio equipment, electrical equipment, hydraulic system, instruments and the structure and installations of the airplane. Although the Anti-Submarine Command squadrons are divided into two states of preparation: patrol and alert, each airplane, regardless of whether it is scheduled for the day's patrol or is to be held in readiness for a quick takeoff in the event of a distress signal from a cargo vessel at sea, is given the same thorough inspection.

The inspection procedure is not a matter of eight men climbing into the airplane and going about his individual business but is a

(Continued on page 60)

Left **The "kill" is chalked up on each plane.** *Right* **Crews check the area to be patrolled**

DOUGLAS A-20 or HAVOC

Two-engine light bomber and ground-strafer

THIS chart shows a structural breakdown of one of our hard-hitting front line planes, showing the various structural units. You will note the fuselage is made like a box which gives it great strength. Wings are skin-stressed, providing great rigidity. This chart should prove helpful in classrooms or shops to show structural elements of a typical modern airplane. This type of ship carries a load of small bombs used for ground strafing, bombarding columns of trucks, tanks, airfields, troops, etc. Though heavy bombs are not carried it has proved very destructive for light work, and has a very high speed for this type of ship. When used by the British it is called the Havoc.

TIPS ON TIPS

Relative efficieney of wing tips with various shapes —best form to use

by

GEORGE H. TWENEY

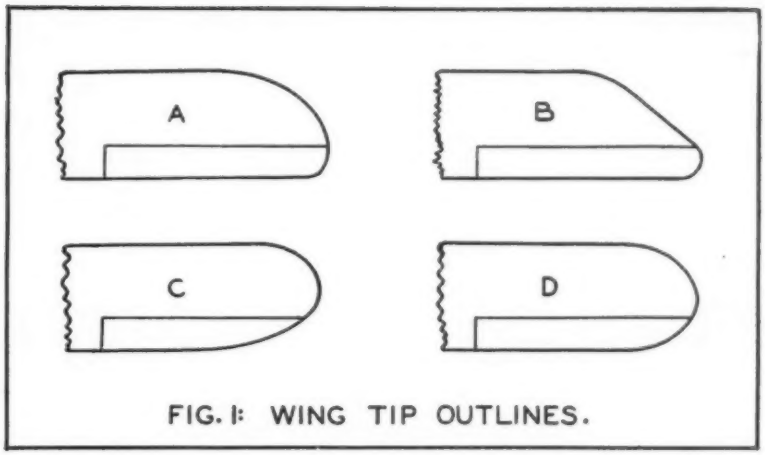


FIG. 1: WING TIP OUTLINES.

THERE have been a lot of articles written about the virtues of this and that type of wing design, and many writers have tried to influence the trends of model design by advocating a certain type planform or trip design. Even full scale airplane manufacturers are beset by conflicting and multitudinous data on the design of wings.

The author here does not propose to propound the advantages of one type of wing, but rather to present in non-technical language results of a number of wind tunnel tests run over a period of several years. It is hoped that an unprejudiced and authoritative discussion of characteristics of more common planforms will help clarify some of the questions undoubtedly existing in the minds of many model builders.

Every model builder knows there are numerous types of wing tip forms, ranging all the way from a square tip to a full elliptical tip; arguments in favor of each range all the way from the easy-to-build characteristics of the square tip, to the supreme aerodynamic efficiency of the elliptical tip.

Four types of tips in common use are illustrated in Fig. 1. Tips A and B are older type forms; C and D are more recent and more desirable forms.

It is interesting to note that pressure distribution tests on wing tips show the load per foot of span of the wing to be independent of the tip planform. Therefore, load per square foot of area at the tip must be less on C or D. This means, of course, the structure at the tip of the wing can be much lighter in the case of the latter two designs, than it can with tips A or B. In the case of gas models, this means the model can be built to have much better lateral balance when tips are lighter.

Without any aerodynamic twist, or wash-in or wash-out, in the wing, wind tunnel tests show that at high angles of attack the center portions of wings equipped with tips A or B stall before the tips. Under these conditions, the proportion of load carried by wing tips is considerably increased. This means that in a gas model or a model with large wingspan the wing deflection will be much greater during the climb when the wing is near the stall, and that the model will be much harder to balance and control.

Wing tip D does not show the above characteristic, and hence would appear to be the best type of planform. Visual airflow tests also show that the wing tip vortices are less with tip D than with any other type of tip, and this means induced drag and wake drag are less. Consequently, it will take less power to pull the wing through the air, or for the same amount of power, the wing will be much more efficient.

Having established the fact that wing tip D is superior, it remains now to establish the exact curvature for a wing planform equipped with this type of tip.

In Fig. 2 is shown a set of five airfoils, with identical size and section, except that the tips were modified as described below. Beginning with the first airfoil which has a rectangular planform, the remaining four airfoils were cut successively from the square planform.

The planform at the ends was in all cases a semi-ellipse, the axis of this ellipse perpendicular to the chord of the airfoil, being 0.75, 1.5, 3.0, and 6.0 times the airfoil chord respectively. The section at any part of the airfoil cut by a plane parallel to the plane of symmetry is similar to sections at the middle of the plane. Arrangement of these five airfoils is clearly shown in Fig. 2; notice this figure shows only half the complete wing from the center line out to the tip; the other wing half was exactly similar.

An analysis of aerodynamic characteristics of these five wings is very interesting:

There is a general rise in maximum lift of each wing as the wing tips are further rounded for all angles of attack, except for extreme positive angles of the wing with ellipse 6.0 times the chord. Increase in lift is the greatest between wings with 0.75 and 1.5 times the chord, and after that it is slower, although still increasing.

The drag of the wing decreases slightly due to a slight rounding of the tips, and then decreases at a faster rate as full elliptical wing is approached. This drag decrease holds true for all angles of attack; which seems to indicate the wing with 6.0 times the chord is much better in this respect.

The increasing lift and decreasing drag result in an appreciable increase in the maximum lift/drag, or L/D ratio, as the wing tips are further rounded. This increase in L/D is rather rapid at first, and

(Continued on page 38)

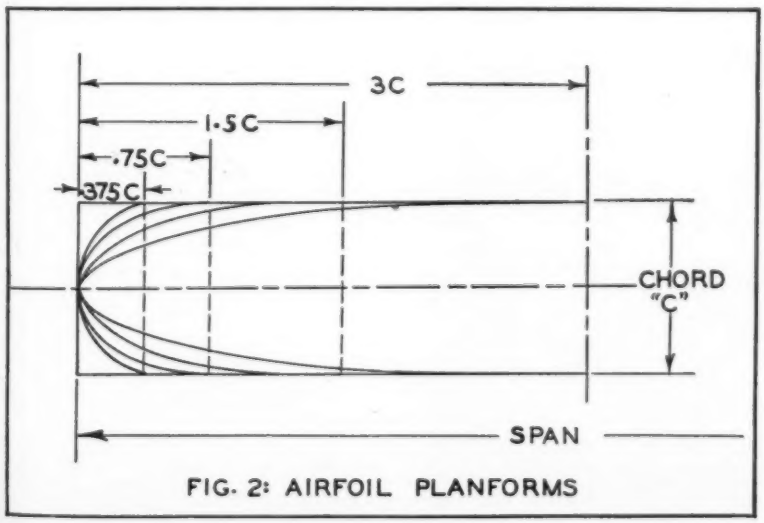
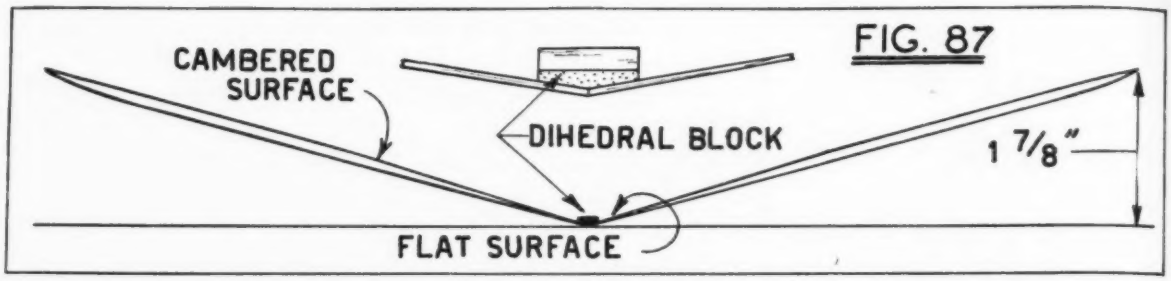


FIG. 2: AIRFOIL PLANFORMS



MODELING YOUR FUTURE IN AVIATION

Official Air Youth course in elementary aeronautics

by **CHARLES H. GRANT**

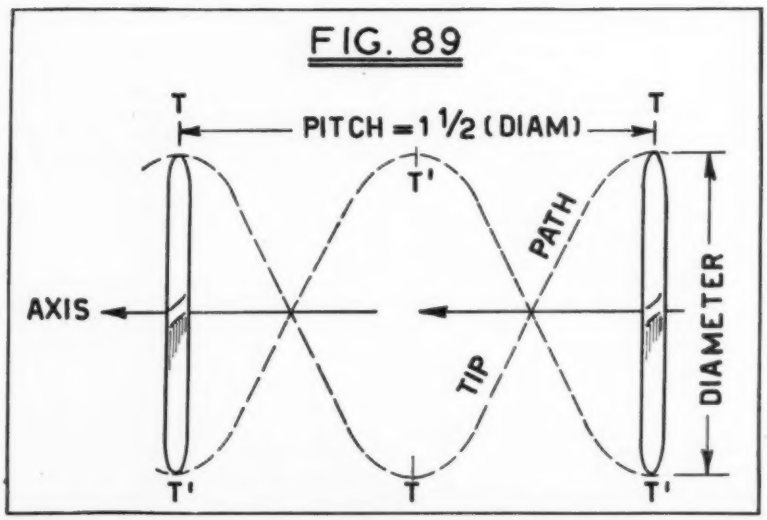
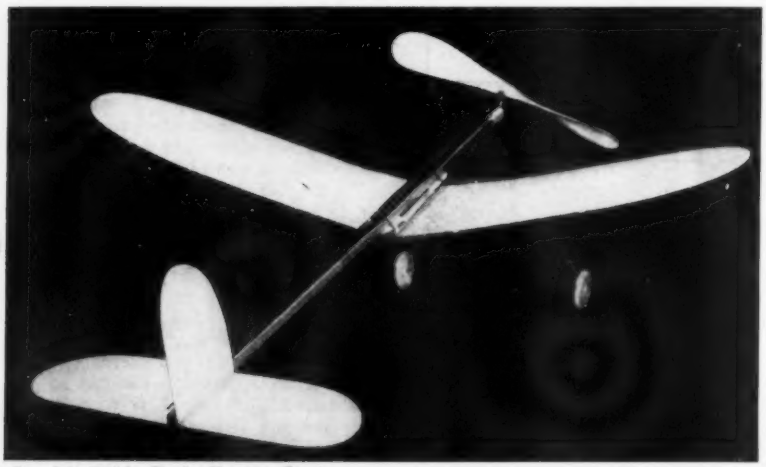


Fig. 88-B. How the test plane appears when made of balsa wood. Note simple construction



Copyright 1943 by Charles Hampson Grant

Lesson 11—How to Construct the Basic Test Model

HAVING determined basic simple proportions for your test plane the structure is then designed to conform to these proportions and drawings made from which the plane is constructed.

Start by laying out a side view of the plane as shown on page 12. First draw in the frame stick, then stabilizer and fin to specified measurements, followed by the wing with proper wing tip rise, Fig. 87, propeller and landing gear.

The wing is to have an angle of incidence of about 2-1/2 degrees so an elevation block 1/8" deep is inserted between the frame stick and wing at the trailing edge. Draw the propeller with an 8 inch diameter and the landing gear long enough to provide a clearance of 1/8 the prop. diam. between ground and blade tip at its lowest point. Wheel diameter is about 0.156 times the prop. diam. or 1-1/4 inches.

Then work out the details such as prop. bearing, tail skid and motor hook, dihedral blocks for the wing ribs and methods of attachment, indicating these in the side view.

The parts drawings then can be made. Draw the landing gear full scale front view allowing a spread between wheels, center to center, equal to the distance from propeller shaft to ground. This will serve as a pattern to show the angle of each bend and wire length between them. Similar full scale drawings should be made of other wire parts such as propeller shaft and tail skid.

If the plane is to be constructed of balsa, as shown in the pictures, Fig. 88-A and 88-B, wing, stabilizer and fin will be made of solid sheet with no cutouts. When hard wood is used—cut out holes should be drawn as indicated on the drawings to reduce weight. To complete the working drawings lay out the propeller block full size, top and side view, indicating dimensions. The drawings then will appear approximately as shown on pages 12 and 13.

You are now ready to start construction. The most difficult task is the propeller and you should be able to carve out a good one before attempting to build other parts. Dimensions of the block from which it is to be cut are given—8" x 1-1/2" x 3/4", but the prop must have a particular shape to operate efficiently; it must be helical, that is, a section of a helix, so the block must be carved according to a carefully laid out pattern.

Before describing how to do this let us consider how the propeller operates; perhaps this will give a hint as to procedure.

Look at Fig. 89. At the right is a

Fig. 88-A. The completed basic test plane. Note the helical twist of propeller blades

propeller which we will assume is attached to a plane and pulling it toward the left. As it revolves it also moves forward, the tips describing paths indicated by the dotted spiral lines. In one complete revolution it will move to the position indicated by the propeller at the left. Propeller pitch is the forward distance travel in one revolution so the pitch is the distance between the right hand propeller and the one on the left. According to our design specifications this is 1-1/2 times the diameter, in this case 1-1/2 x 8" or 12 inches. The tips travel in a circle a distance of 3.1416 times the diameter 8" or about 25" while the propeller moves forward 12 inches. So the angle formed by the blade at the tips and the direction of rotation perpendicular to the shaft is established by these two measurements. Look at the end view of the propeller block shown in the drawings. The long edge or width represents the sideways travel of 25 inches, the short edge or depth, the forward travel of 12 inches. When the block sides are proportional to these distances the blade tip, parallel with the diagonal, will have the proper angle for the required pitch or forward travel.

The center point of the blade half way between hub and tip travels in a circle only half as large so the sideways movement is only half as much as at the tip. Yet it moves forward the full pitch distance of 12 inches. So the block at this point must be half as wide as at the tip and the angle twice as large.

The blade angle, at other points along the blade, measured relative to the long edge of the block end, is proportional to the distance of any point from the blade tip. At the propeller axis it is 90°, parallel to the line of flight because this point only moves forward, having no sideways motion.

With this information it is possible to lay out guide lines on the block for carving the propeller.

Consider Fig. 90 showing the block. By drawing diagonal lines on the wide faces of the block as shown, from A to D, B to C and from A1 to D1 and B1 to C1 a basic pattern for the blades is created that conforms to requirements. For instance at the mid point of each blade or half block, the distance between diagonals is only one half the width at tips. So if the blades are carved so diagonal B1 C1 is the blades leading edges and diagonal A D forms the trailing edges, the propeller will be a true helix and fulfill requirements.

So after marking a hub around the axis O as in Fig. 90, cut away the block outside of the diagonals (shown cross hatched on the plans for the block) making the sides at right angles to the face. Then the block will appear as in Fig. 91, ready for the first operation of carving the blades. Draw diagonal lines A B1 and D C1 on the block ends to serve as guides in carving the blade tips.

The concave or rear blade faces are shaped first by cutting away edge O B; shaving the wood away a little at a time

(Continued on page 54)

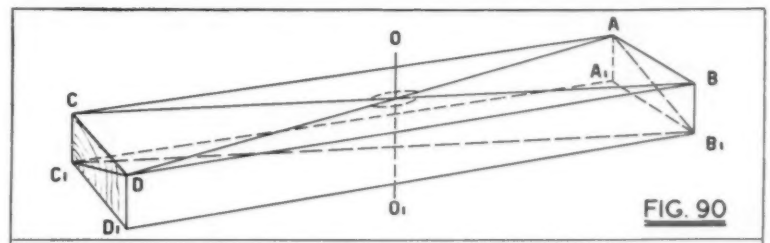


FIG. 90

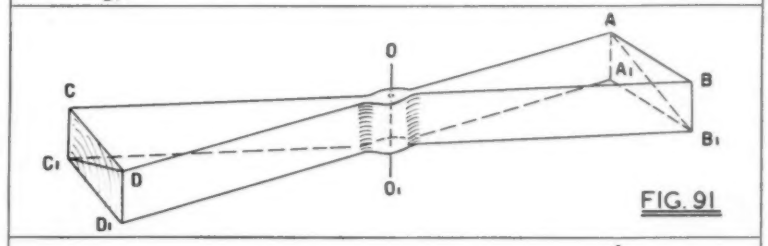


FIG. 91

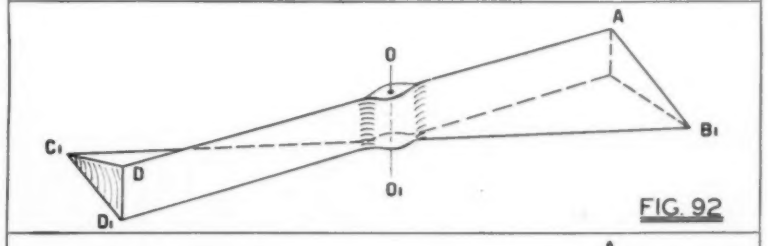


FIG. 92

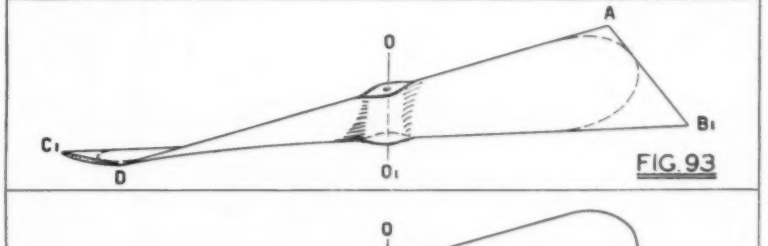


FIG. 93

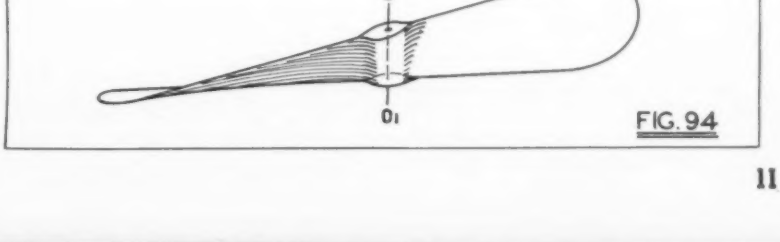
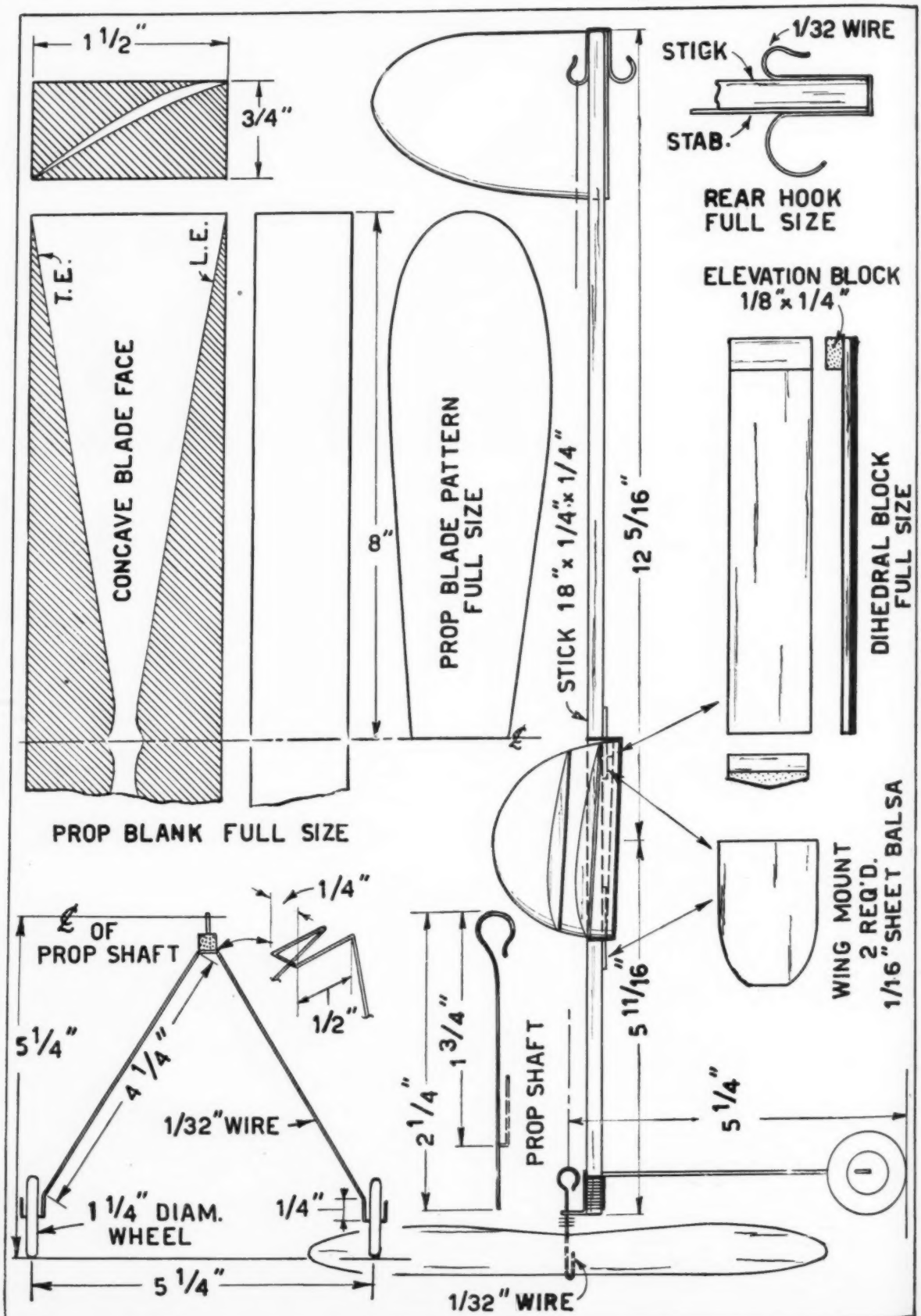
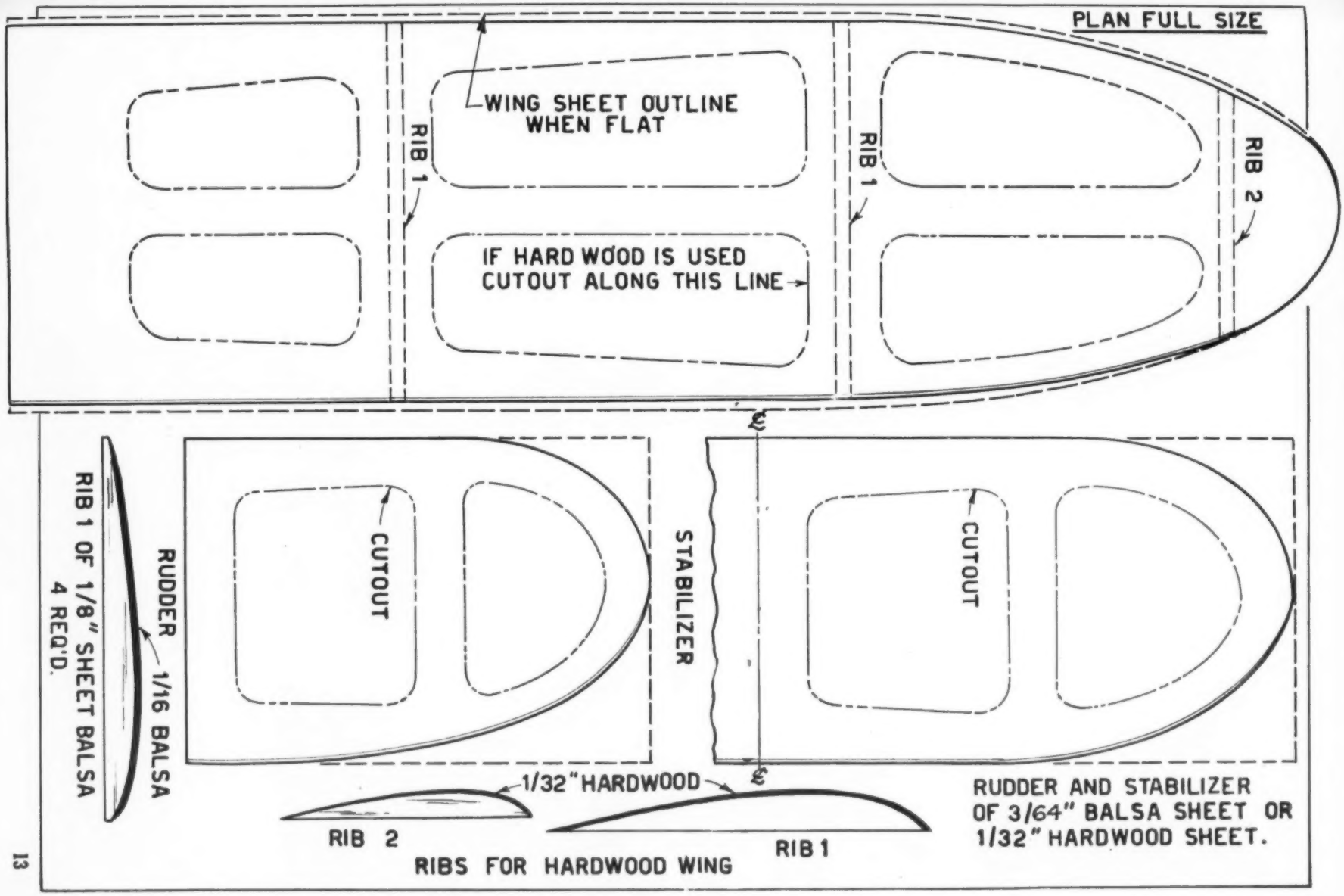


FIG. 94


1 1/2"
3/4"
1/32 WIRE
STICK
STAB.
REAR HOOK
FULL SIZE
T.E.
L.E.
CONCAVE BLADE FACE
8"
PROP BLADE PATTERN
FULL SIZE
STICK 18" x 1/4" x 1/4"
12 5/16"
ELEVATION BLOCK
1/8" x 1/4"
DIHEDRAL BLOCK
FULL SIZE
PROP BLANK FULL SIZE
1/4"
OF
PROP SHAFT
1/2"
5 1/4"
4 1/4"
1/32" WIRE
1 1/4" DIAM.
WHEEL
1/4"
5 1/4"
2 1/4"
1 3/4"
PROP SHAFT
5 11/16"
WING MOUNT
2 REQ'D.
1/16" SHEET BALSA
5 1/4"
1/32" WIRE


PLAN FULL SIZE
WING SHEET OUTLINE WHEN FLAT
RIB 1
RIB 1
RIB 2
IF HARD WOOD IS USED CUTOUT ALONG THIS LINE
CUTOUT
CUTOUT
STABILIZER
RUDDER
RIB 1 OF 1/8" SHEET BALSA 4 REQ'D.
1/16 BALSA
1/32" HARDWOOD
RIB 2
RIB 1
RIBS FOR HARDWOOD WING
RUDDER AND STABILIZER OF 3/64" BALSA SHEET OR 1/32" HARDWOOD SHEET.

FRONTIERS

Latest developments in the science of air war

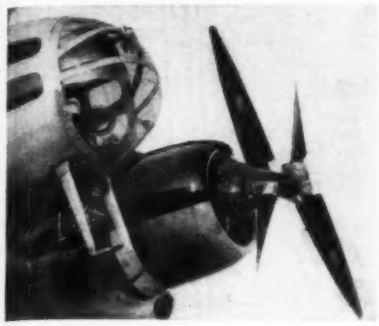
RECENT battles in North Africa indicate the great importance of new developments, both in equipment and maneuver.

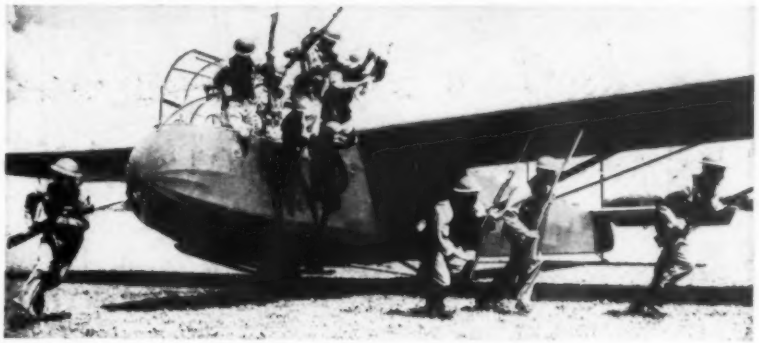
The tide at Alamein was turned by new and untried American tank destroyers produced on the "spur of the moment." This unexpected weapon did not enter into the defensive plans of the Germans, consequently they were not prepared for them. In the recent attack through Kasserine Pass the Germans won the first round not only because of the suddenness of their attack but due to the unexpected use of 50-ton tanks, against which the Americans had no prepared defense.

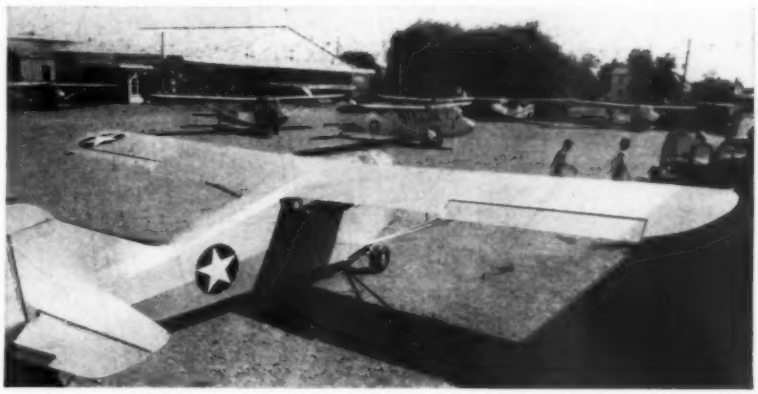
But the story did not end here; true to their reputation for ingenuity the Americans injected a surprise of their own—in the nature of aerial warfare. Again, the surprise element turned the tide against the Germans in favor of the Americans.

Lacking any concentration of heavy artillery and being robbed of their forward flying bases, the Americans apparently had little defense for the Germans' heavy tanks. Range of fighters and ground strafing planes was limited so they could not operate effectively from bases located farther to the rear. However the Americans invented a new form of aerial attack which probably will prove most successful in the future, and which certainly prevented the Germans' push from becoming a serious menace west of Kasserine Pass.

This surprise was the use of heavy Flying Fortresses as ground strafers. Having long range they could operate from bases far to the rear, not affected by the German push. Flying from these they carried a large load of small bombs, only a few of which the average ground strafer could deliver. The Fortresses,







flying over the German columns of tanks, transports and infantry, showered wide areas with high explosives. Even the 50 ton Mark VI German tanks were vulnerable to this form of attack and its effectiveness is disclosed by the demoralization and hurried retreat of German-Italian forces.

This clearly illustrates that a great deal of future success depends upon the ingenuity of our airmen. With each succeeding day airpower is forging ahead in importance. A plane today is antiquated tomorrow. Improvements in both design and armaments are evident with each new plane delivery.

Fighters early in the war carried only light machine guns, today they are carrying as many as 4 cannon and 4 machine guns—a veritable arsenal. The picture at the top of page 14 shows some of the latest gun-firing Spitfires hurrying out on a mission; .37 mm. cannon can be clearly seen protruding from each wing. Lighter machine guns fire from the fuselage. Though carrying heavy gun loads these Spitfires have been improved aerodynamically and mechanically so performance is greater rather than less. They are still the No. 1 single seat fighting plane on the European front.

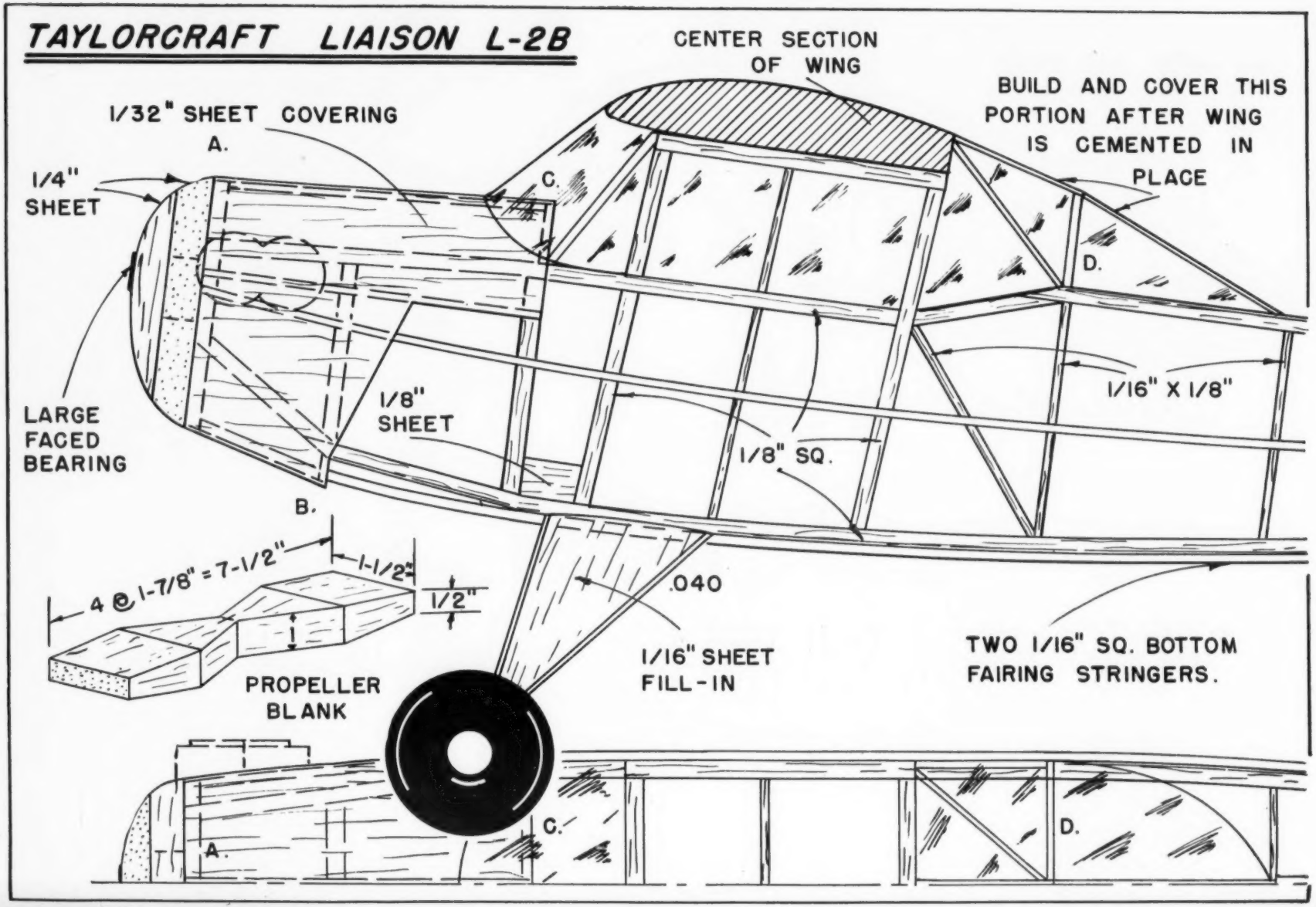
One of the major mechanical improvements is illustrated in the second picture to the left. It is a 4-bladed propeller mounted on a Spitfire. Engine power has been increased to such an extent that extremely large 2- or 3-bladed propellers have been necessary to absorb all of the power; in fact they have been too large for ordinary planes. Consequently, rather than increase the propeller diameter, blades have been added to absorb the added power.

One of the most unique developments so far evident on the battlefront is a plane equipped with a large magnetic ring for exploding enemy mines. It is illustrated in the picture on the left, second from the top, page 14. The ring consists of a casing enclosing a magnetic coil. Current and a resulting magnetic field is supplied by an auxiliary Ford V-8 engine. When flying over a mine the magnetic field developed by the coil causes the mine to explode, often so suddenly that the plane is jarred violently due to the necessity of flying close to the water.

The first question arising to practical minds is: how is it possible for an air airplane to carry such a large heavy ring? The casing in itself would have consider-

(Continued on page 51)

TAYLORCRAFT LIAISON L-2B



BUILD THIS FLYING "JEEP"

How to build and fly a model of Uncle Sam's new liaison plane

by **SYDNEY STRUHL**

IN SHARP contrast with terrific advancements made by military aviation in the 400 mph pursuit ships and 2000 hp engines, we have developments made in the lightplane that is coming into its own in this modern war. Operational experience under actual warfare conditions have shown that there is a definite place and need for the "lightplane," as we have grown to call our sportplanes of under 100 horsepower. These lightplanes do practically any job called for: they act as observation ships and liaison work, personnel transport, cargo transport, air spotters, artillery directors, photographers, etc.

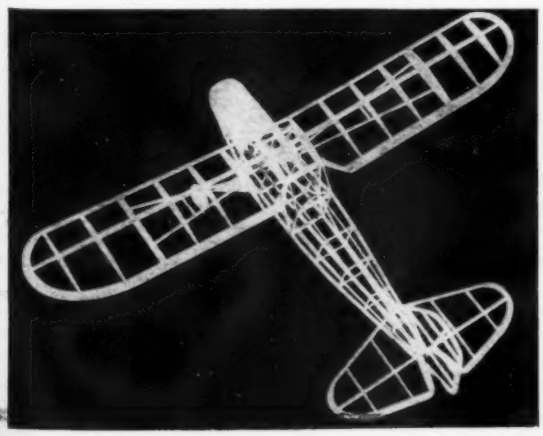
So desperate was the Army's need for these lightplanes that they bought commercial versions of Aeronca, Taylorcraft, Piper and other manufacturers as they came off the assembly lines, painted the U. S. insignia on the wings and the ships were off to war. But typical of American industry, lightplane producers got busy over their drawing boards, made modifications on their planes that would give us every bit of advantage possible, and thus emerged the military versions of our peacetime sportplanes. We present one of these ships as our flying scale feature this month, the Taylorcraft Liaison L-2B.

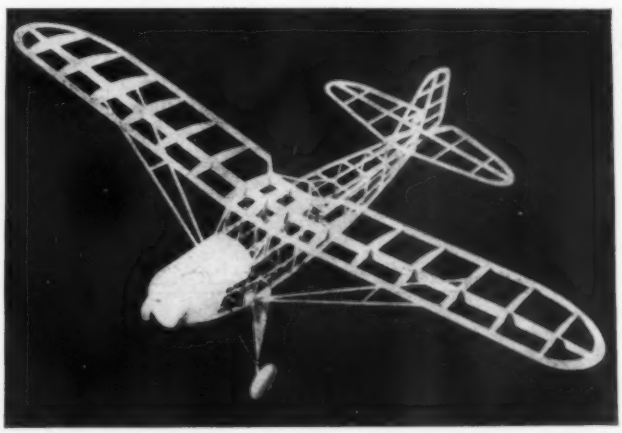
The Taylorcraft L-2B is the military version of the tandem liaison trainer. Arranged as a two seat machine, it differs from the civil type in that it has a completely redesigned fuselage with large transparent panels installed under and behind the wing for excellent visability. Also a two-way radio is provided. It is powered by a four-cylinder horizontally-opposed Continental A-65 engine of 65 hp. Top speed, 104 mph; landing speed, 35 mph; climb 600 ft. per min.; cruising range, 300 miles on 14 gallons of gas.

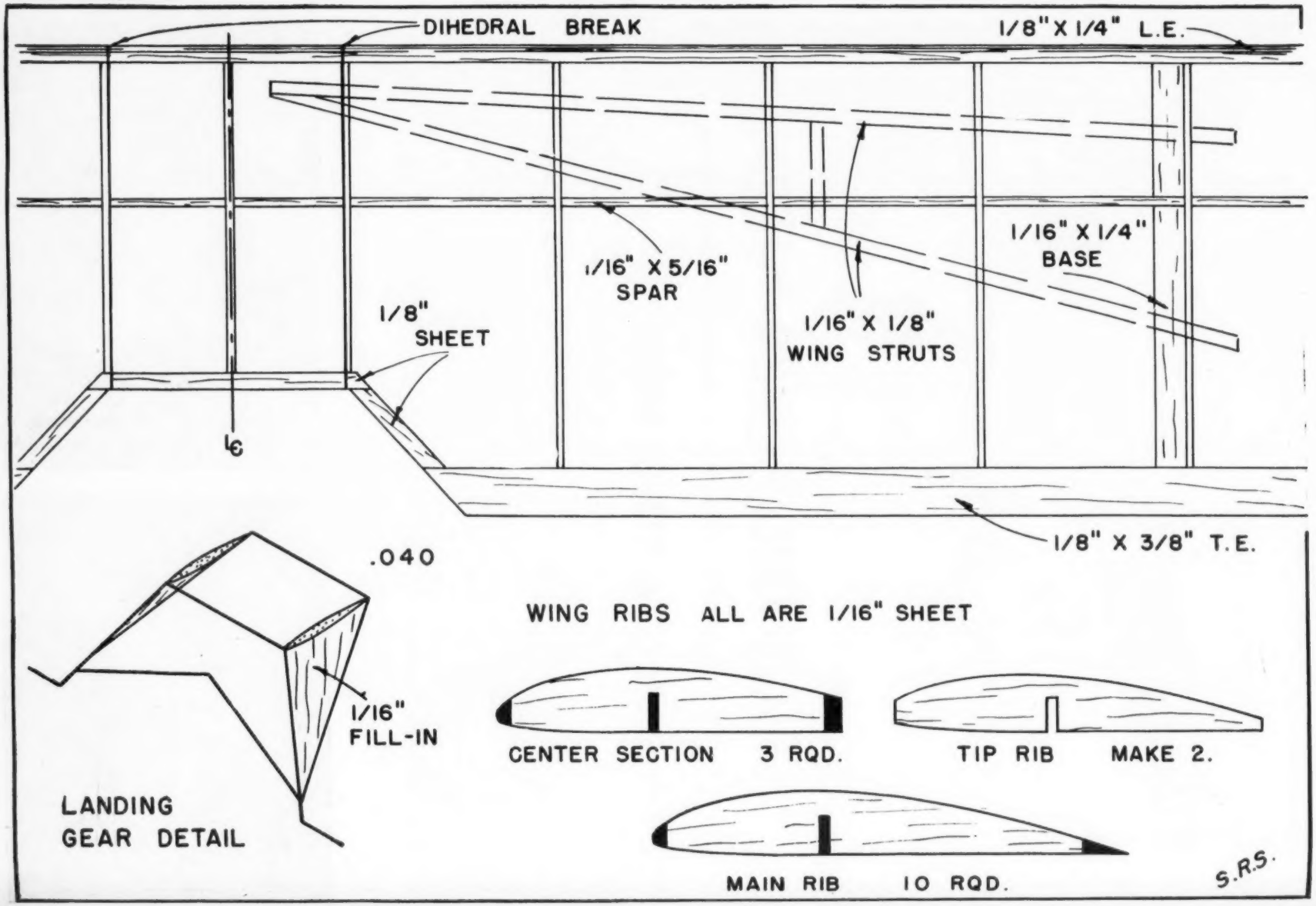
The model has the same fine characteris-

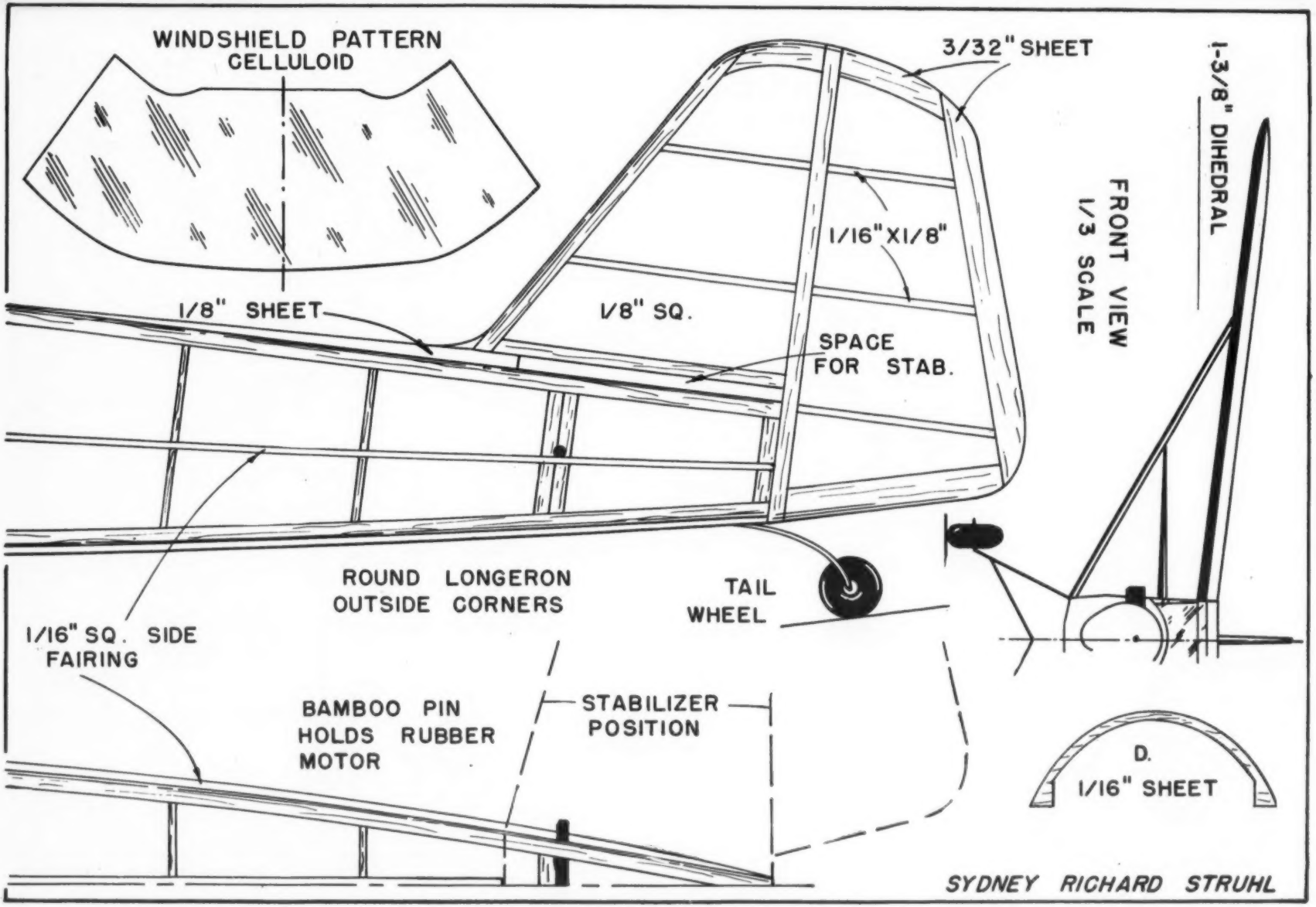
(Continued on page 35)

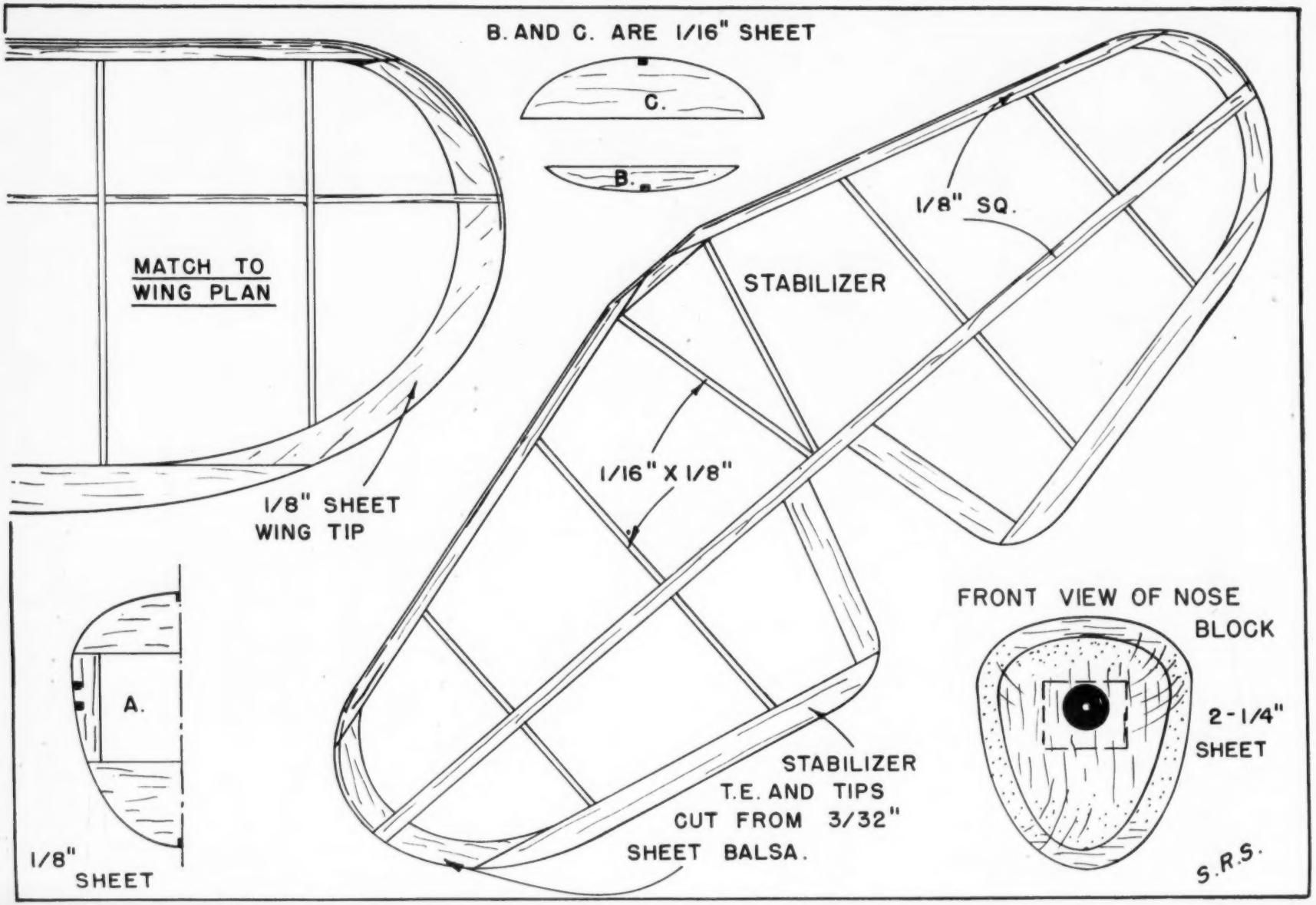
Top **The finished model is not only realistic but a fine flier with its large propeller** *Below* **The completed framework is simple, light and strong.**

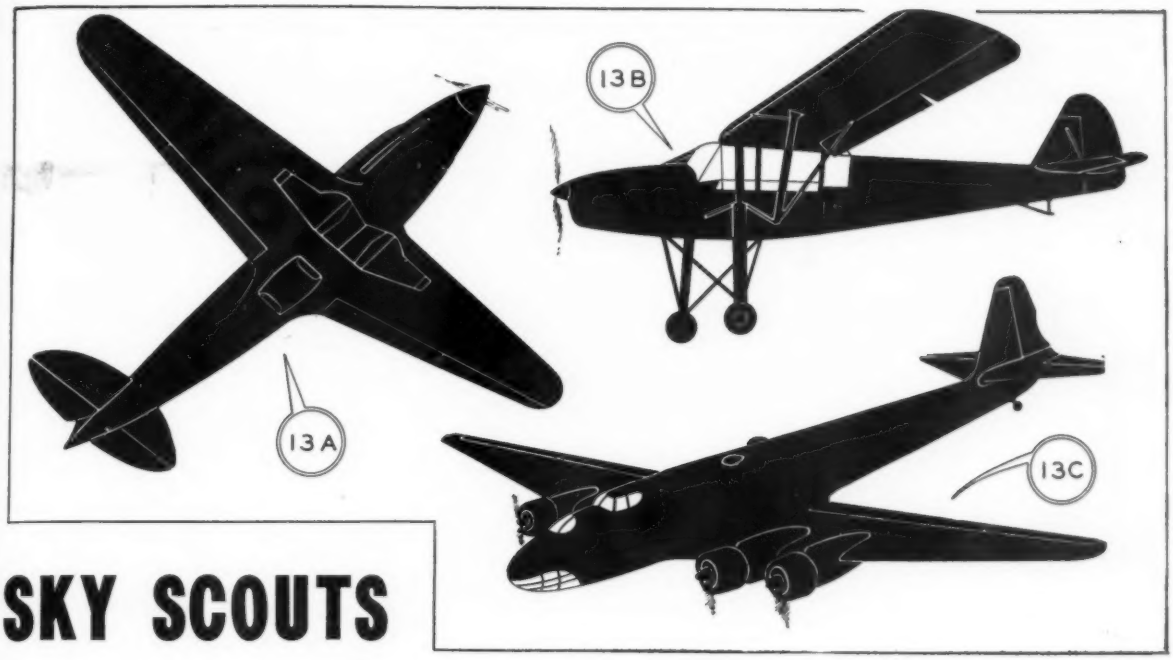





DIHEDRAL BREAK
1/8" X 1/4" L.E.
1/16" X 5/16" SPAR
1/16" X 1/4" BASE
1/8" SHEET
1/16" X 1/8" WING STRUTS
1/8" X 3/8" T.E.
.040
1/16" FILL-IN
LANDING GEAR DETAIL
WING RIBS ALL ARE 1/16" SHEET
CENTER SECTION 3 RQD.
TIP RIB MAKE 2.
MAIN RIB 10 RQD.
S.R.S.


WINDSHIELD PATTERN
CELLULOID
3/32" SHEET
1-3/8" DIHEDRAL
FRONT VIEW
1/3 SCALE
1/16"X1/8"
1/8" SHEET
1/8" SQ.
SPACE
FOR STAB.
ROUND LONGERON
OUTSIDE CORNERS
TAIL
WHEEL
1/16" SQ. SIDE
FAIRING
BAMBOO PIN
HOLDS RUBBER
MOTOR
STABILIZER
POSITION
D.
1/16" SHEET
SYDNEY RICHARD STRUHL


B. AND C. ARE 1/16" SHEET
C.
B.
MATCH TO WING PLAN
1/8" SHEET WING TIP
1/8" SQ.
STABILIZER
1/16" X 1/8"
A.
1/8" SHEET
STABILIZER T.E. AND TIPS CUT FROM 3/32" SHEET BALSA.
FRONT VIEW OF NOSE BLOCK
2-1/4" SHEET
S.R.S.



SKY SCOUTS

How to "spot" planes and help defend your country

MANY organizations and individuals throughout the country are engaged in studying different types of planes, so they can recognize them readily and possibly render their country a service as "spotters." Data and flight vews of planes are not always available for study, especially many new enemy types. Also there are so many new different types of craft that it is nearly impossible to distinguish all of them. However this does not prevent a spotter from making valuable observations concerning enemy planes that he may see.

Two types of information are important concerning any airplane: first, its mission and, second, its make or nationality. Knowledge of a few basic facts concerning planes, arrangement and structure will usually disclose its mission; its outline and particular features of design disclose its nationality or make. Though it is not always possible to determine the latter, an intimate knowledge of plane types will disclose the former.

Here are a few hints that may prove of value concerning the method of observation. If you follow this general spotting system the greatest amount of information can be obtained from observing a plane in flight.

First, when sighting a plane observe the number of motors. Second, its general proportions, whether the fuselage is long and thin or fairly short and stubby. Third, the proportion of the wings. Fourth, whether irregularities in fuselage contour indicate gun turrets or firing points. These features usually determine the plane's mission. Fifth, consider the outline of the wings, tail surfaces and fuselage. This will disclose its nationality or make.

Now let us examine these various points; first, the number of motors. Light machines usually have one motor and such a plane usually indicates the pursuit, observation or sportplane. The distinguishing difference of the latter is that the wing is high and it has a landing gear. Usually observation planes are quite bulky with deep fuselage, having a "greenhouse" or observation windows along the top of the fuselage. A single engine pursuit plane is indicated generally by a fairly large wingspan compared to wing chord, and a cockpit for one man with well streamlined fuselage that is usually stubby or short compared to other planes such as bombers, though not as stubby as an observation plane. Some pursuit planes have two engines and it is difficult to distinguish them from light bombers, in fact such planes are often used for pursuit and bombing. There is one distinguishing difference which takes keen observation: the pursuit usually is faster and smaller, though these features are difficult to determine at great distances.

Planes with more than one engine are usually "weight carriers"; four engines indicate heavy bombers, and that danger from attack is imminent. Fuselages of bombers are usually long and slender, their wings broad and narrow. It may be difficult sometimes to determine the difference between bombers and cargo or troop transports? There is very little difference; both carry a large weight, have multiple engines and the same general shape. However the fuselages of transports usually are not as long and slender as bombers, though this is not always true. One other difference on transports is the lack of gun turrets and emplacements; also there is usually no greenhouse or observation point in the nose but only the pilot's cabin or cockpit. Sometimes a bomber can be determined from a pursuit by the way it flies; a bomber will be slower and steadier in flight.

The most difficult part is determining the nationality and make of the plane and you must have an intimate knowledge of different wing planforms, rudder and stabilizer shapes. This can only be evident by careful study of pictures or planes of different shapes.

Now, for practice, let us consider the silhouettes at the head of this column. First you will see 13A flying overhead. It is clear that this is a one engine ship. The body is well streamlined and the wings tapered, also the stabilizer is comparatively small and well rounded. All of these facts indicate the pursuit plane. Tails of observation planes usually are larger. If this one engine ship is a bomber the load of bombs carried, at most, would be small because of its comparative low power. So you are pretty safe in deciding that this plane is a pursuit.

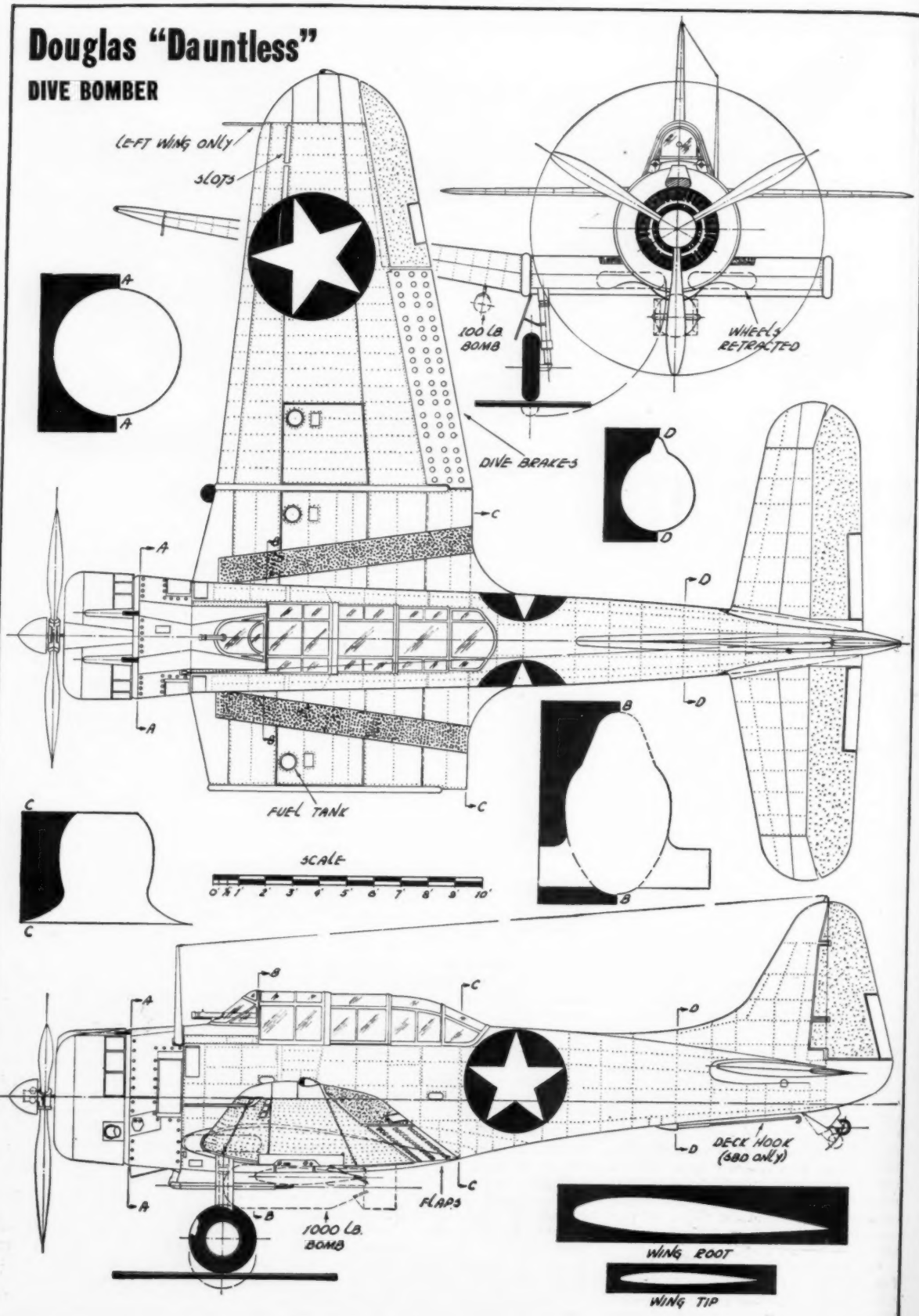
The make of this ship is not obvious. There is a characteristic oval shape to the stabilizer and those familiar with all types of planes could correctly name this as the Italian Macchi C202 fighter. Description of this and of the other two planes are given further on.

Next consider plane 13B. This is an unusual looking contraption and the casual observer might think that it was a sportplane; it has a single engine, high wing with a cabin and external strut bracing. However there are certain distinguishing and different features. First, it has a very long landing gear and a comparatively long fuselage. The long fuselage indicates a desire for steadiness of flight on part of the designer. It possesses a long landing gear for only one purpose: steep slow landings. When a plane sinks to the ground at a steep angle there is considerable vertical shock which must be taken up by a landing gear with large shock absorbing reaction; the long struts indicate a large upward movement of the wheels to absorb this

(Continued on page 52)

Douglas "Dauntless"

DIVE BOMBER



DEVIL DIVER

The plane on the cover

TWO weapons have distinguished themselves in this war: the torpedo plane and the dive bomber. These two aerial terrors have figured in every naval action to date, being solely responsible for destruction of the U.S.S. Arizona, U.S.S. Oklahoma, H.M.S. Royal Oak, H.M.S. Hood, H.M.S. Prince of Wales, H.M.S. Repulse, and a battleship of the Japanese Kongo type. Only the Graf Spee and the Bismarck, among the battleships sunk in this war, have escaped the wrath of these two deadly plane types. Innumerable cruisers, destroyers, auxiliaries and cargo vessels have been sent to the bottom by the powerful attack of the dive bomber and the torpedo plane. In the May 1942 issue of MODEL AIRPLANE NEWS we told you of the Douglas Devastator torpedo plane and in the September 1942 issue we introduced the now famous Grumman Avenger. Certainly the dive bomber now deserves our attention.

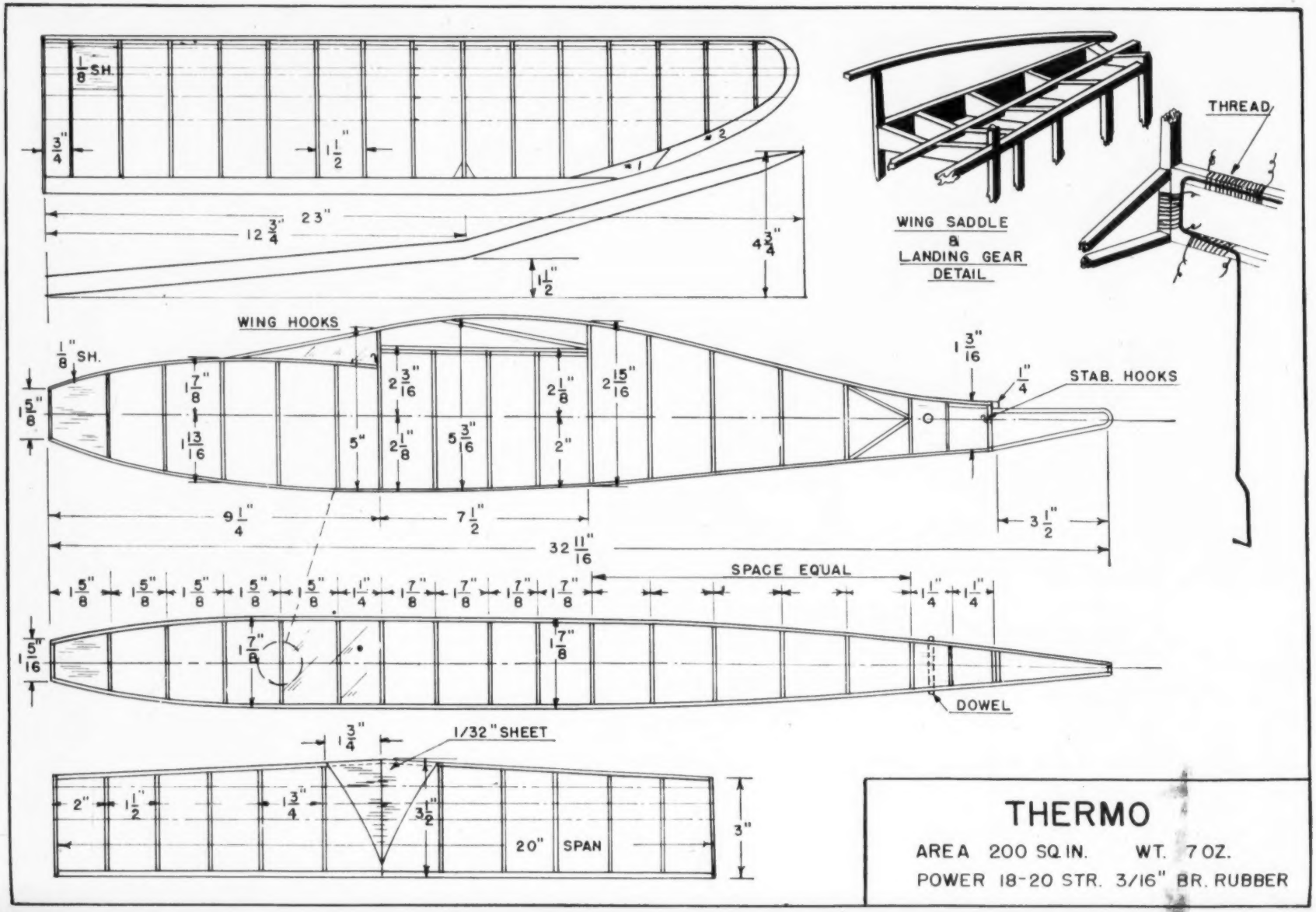
The first recorded use of dive bombers was during the United States' intervention in the Haitian insurrection in July, 1915. The battleships Washington and Montana sailed into Port Au Prince thereby relieving the gunboat Dubuque (PG-17) which sailed around to Cape Haitian on the north side of Haiti. During the action several airplanes arrived from Guantanamo Bay and bombed the resisting natives in "steep dives releasing their bombs while still in this attitude." After a successful campaign, the planes returned without loss to go down in history as the first dive bombers.

The world's first specifically designed airplane for the purpose of dive bombing was the famed Curtiss Helldiver F8C-4 of 1930. Although the Navy had continued its experiments with dive bombing following World War I, it was not until the Helldiver made its appearance that development of the type began in earnest. This ship had a wingspan of 32 ft., was 25 ft. 11 in. long and featured a powerfully wire-braced biplane wing arrangement. Powered by a P&W Wasp engine of 450 horsepower, the Helldiver had a top speed of 141 miles per hour and often reached 250 mph in diving. The Great Lakes BG-1, appearing in 1933, introduced the bomb displacement gear and the Vought SBU-1 was the first dive bomber to be equipped with a speed-reducing apparatus, the landing flaps being used for the purpose.

In 1935 the Northrop Corporation of Inglewood, Calif., produced the first successful monoplane dive bomber, the BT-1.

(Continued on page 56)

Above **A Dauntless dives on its target with retarding flaps down.** ***Below*** **Also serving as a scout, this Dauntless drops a message to the deck of a carrier**



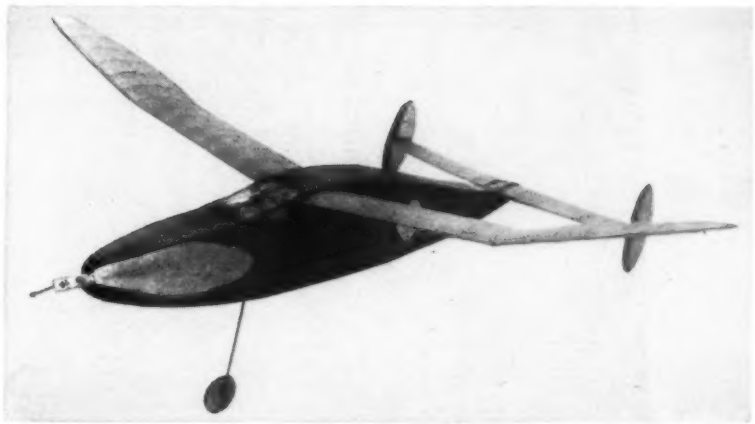
THERMO

AREA 200 SQ. IN. WT. 7 OZ.

POWER 18-20 STR. 3/16" BR. RUBBER

"THERMO" CONTEST WINNER

A high performance fuselage model that has no peer



by BYRON ABBOTT

BEFORE designing a ship most modelers have some main object in mind. In this case it was a simple plane with less drag than the usual square job. Less drag means more minutes in the air and more minutes means more contests.

Two different wings, two different propellers and different strands of rubber were among the experiments on this design. During its first flights it did over 3 minutes on 600 turns; this was on a winter day minus risers. It has a medium climb with a slow sinking glide. In the only three contests entered it took first place in each. The most remarkable flight was a contest held at Anderson, Ind. Its first flight with 600 turns was over 2 minutes, but the second was a heart warmer. It rose very fast to meet a strong riser, still climbing it reached an altitude of about 2000 ft. where it cruised in tight circles near the field. After 23 min. 48-1/5 sec. it passed from sight. Later it was returned to the field by a couple of lads, claiming they found it 5 miles from the starting place. The third flight was over 3 minutes, giving a total time of 29:29 to win first place.

Before starting to construct this model read carefully all instructions and plans. Then draw all scaled parts to full size. Notice: Draw wing mount exactly like drawing.

BODY AND LANDING GEAR: Wax paper should be spread over drawing, then pin 1/8" sq. longerons down in plans. From med. 1/8" stock cut all uprights to length and cement in place. Then make another side directly on top of first. When dry cut and glue in all crossbraces starting at the widest section and working in both directions; rubber bands and pins will hold body in shape while glue is drying. Check frequently to keep body square. Formers XY are then traced from plans and glued in at station 7 to 10. This forms wing mount. Dampen fuselage sides with water to prevent springing out of shape. On both sides 1/8" sheet gussets are glued at station 7. These serve as wing hook anchors. There are two small gussets at rear (station 18) which anchor two small hooks, and one hook is located where fuselage joins in rear. These are for elevator rubbers. Now fill nose and tail as indicated with 1/8" sheet. Top of rear hook section is covered with cellophane. 3/16" holes are bored through rear 1/8" fill-ins to receive 3/16" dowel; likewise, metal plates are drilled. These are glued on inside of fuselage as indicated.

Landing gear is bent from 1/16" music wire over full size drawing, glued in place at station 6 and braced by balsa strips and thread. Several coats of glue should then be used. 1/8" square stringers are then added to complete body. Notice: Top stringers form center piece for windshield.

WING: A template should be made of full size rib and 31 ribs cut from 1/16" soft sheet. Pin them together, sand and notch uniformly. Pin down 1/8" x 3/16" spar to plan. Then glue and drop ribs in their places. Trailing edge should be sanded to a knife edge and notched to receive ribs, before gluing in its place. Next add 1/8" sq. leading edge and wing tips. When two panels are completed, they should be joined and glued at the center. Give each panel 1-1/2" dihedral under station DB; add gussets and glue again. After this is dry, break each tip at DB and raise them 4-3/4". After several hours drying add 1/16" sq. spars and sand wing to shape.

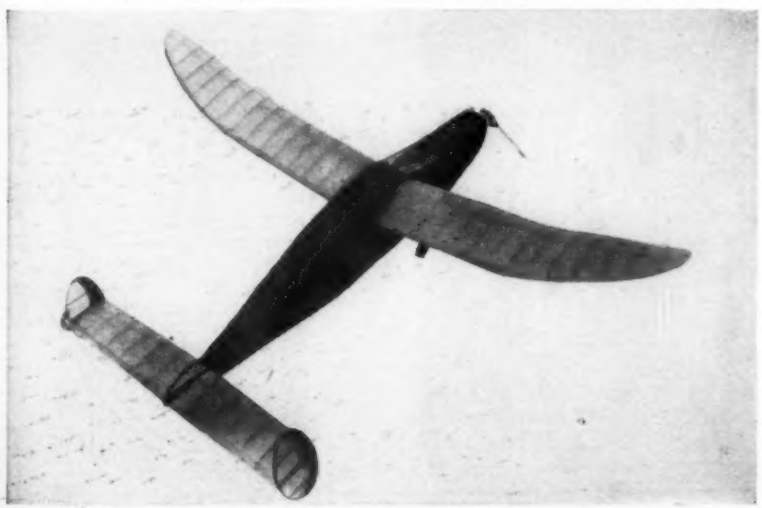
ELEVATOR: This is made in same menner as wing except no dihedral is needed. Ribs are shortened and taper towards the ends. End rib is offset to give rudder slight turn. Notice: Pins through leading edge and small blocks at rear serve as guide to keep elevator in alinement.

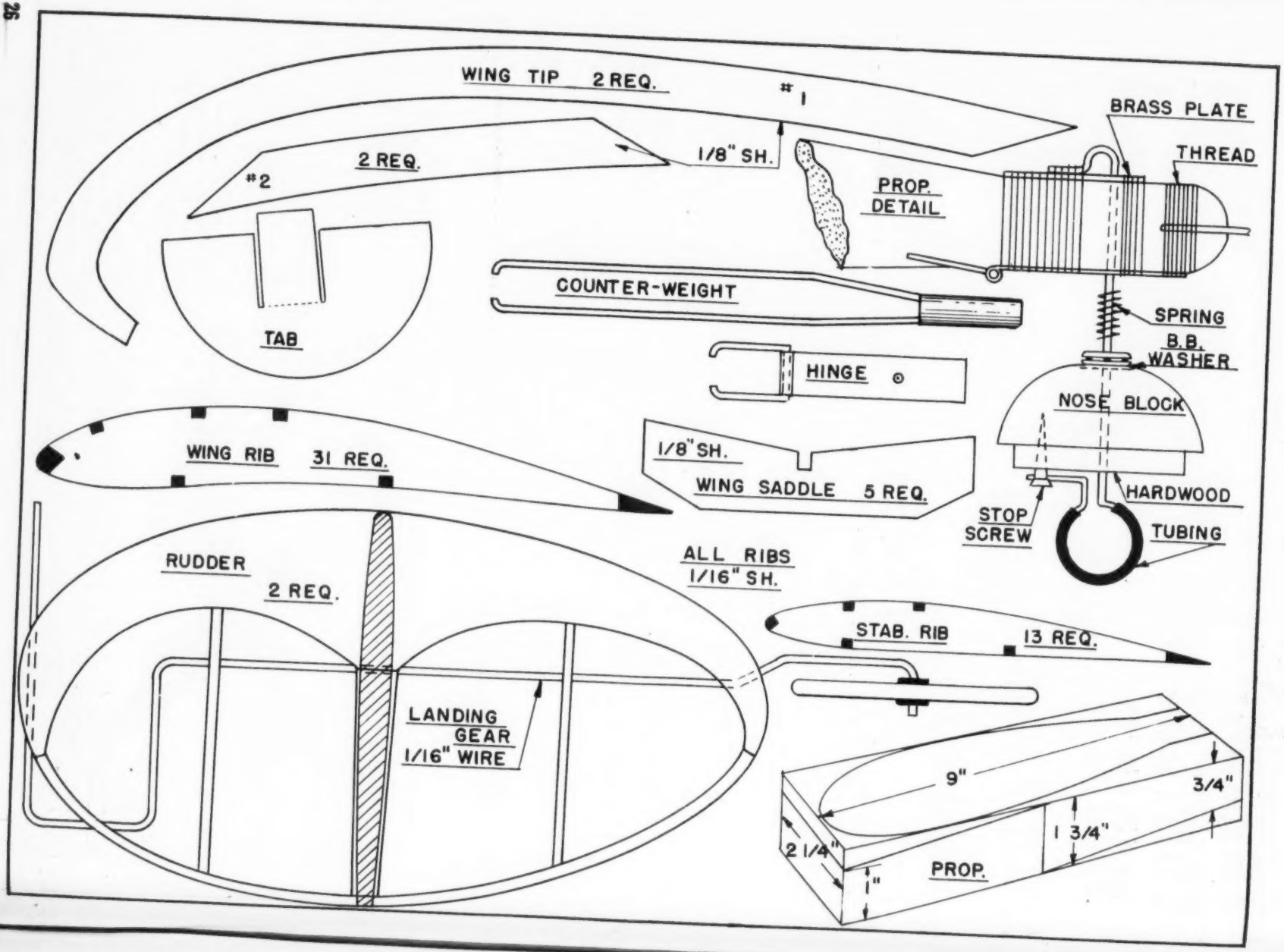
RUDDER: Rudder is flat and made entirely of 1/8" stock. When completed sand to a streamlined shape.

PROPELLER AND NOSE BLOCK: Nose block is cut from hard balsa with a 1/4" pine plug glued to its rear face. Drill the 3/32" hole straight through the nose block; then the metal plates are glued in place. Prop is laid out as shown, then start carving on rear face. This should be sanded to 1/8" under-camber. The outside of blade is carved and sanded to an airfoil crossection. After metal fittings have been cut and drilled they should be bound with thread and glued in place. Prop hinge is bent over a length of No. 40 wire and wire is bent in a "U" shape, then bound and glued to end of prop.

(Continued on page 39)

Every line of the finished plane shown below and above indicates capacity for long flights. A lifting tail gives great buoyancy.




WING TIP 2 REQ.
#1
2 REQ.
#2
1/8" SH.
TAB
PROP. DETAIL
BRASS PLATE
THREAD
COUNTER-WEIGHT
SPRING
B.B.
WASHER
HINGE
NOSE BLOCK
WING RIB 31 REQ.
1/8" SH.
WING SADDLE 5 REQ.
HARDWOOD
STOP SCREW
TUBING
RUDDER
2 REQ.
ALL RIBS
1/16" SH.
STAB. RIB 13 REQ.
LANDING GEAR
1/16" WIRE
9"
3/4"
1 3/4"
2 1/4"
1"
PROP.

AIRPLANE DESIGN FORUM

Analysis and discussion of ideas, and answers to perplexing problems submitted by readers

NEW and unique demands of frontline action have not only placed a vital problem before our foremost airplane designers, but have also stirred the imagination of many young embryo-engineers. It has become increasingly evident that our warplane designers have not been "run up a blind alley." At one time designers believed the limit of efficiency and application had been reached; however, inventive genius inspired by battle has exploded this idea and exposed broad unexplored fields that will occupy attention of our future engineers for some time to come.

Many model builders are interested in designs of large ships; in fact, that is the reason why they build and fly models. It is a cheap and easy way to work out original ideas, and many are unique and valuable in spite of the possible youth of their creators. Lacking in experience, in many cases, designs are produced which are slightly fantastic and impractical yet have a "germ" of value.

The only possible way to correct wrong impressions and to understand correct procedure is to submit such ideas to careful analysis. This Forum has been originated for this purpose. Readers are invited to send in their "brainstorms," their original designs, so they may be exposed to the "light of reason"; in other words, discussed from a standpoint of their practical value. This is one of the quickest ways to teach the problems involved in designing airplanes. In the end it should prove a valuable supplement to an aeronautical career.

Our first presentation is shown in the accompanying drawing—a design for a Prone Fighter, by James Smith. Many have not heard of this type of ship; it indicates the modern trend. The pilot lies in a horizontal position instead of sitting upright. This arrangement may at first consideration appear absurd; however, certain vital reasons have made designers consider it seriously.

First, is the inability of the pilot to remain conscious while diving at tremendous speeds; when sitting upright while pulling out after a steep dive the terrific centrifugal force drags the blood from the upper part of the body, causing unconsciousness and often death due to a resulting crash. With the increase in diving speeds this has become a serious problem; experience having shown that little effect is caused by dives when the pilot lies prone.

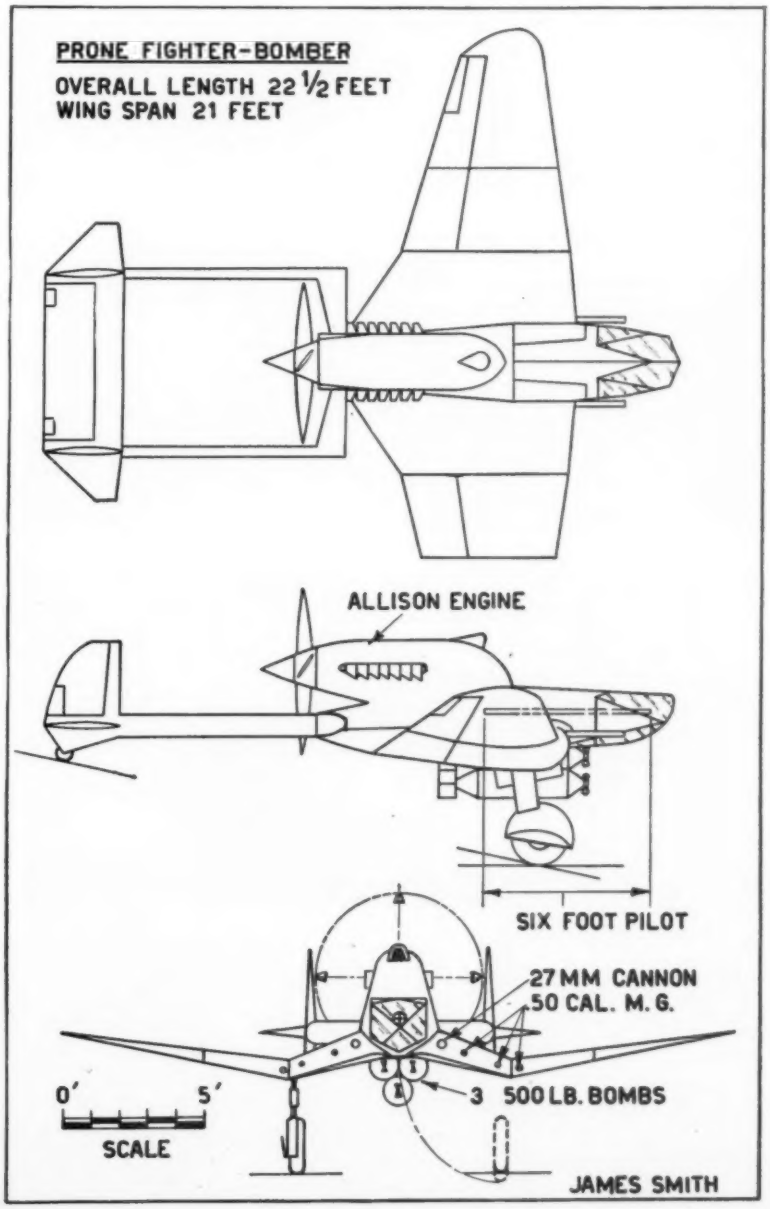
There is also a second advantage: a fuselage of smaller crossection can be used. When sitting upright the pilot presents greater forward area than when lying prone.

Now let us examine Smith's design and determine its value in light of these conditions. The general planform of the wing is excellent for a dive bomber which requires a fairly large chord compared to its span, in order to give strength and rigidity for high speed dives. The gull wing especially, indicated in the front view, also is excellent. This type of wing provides the least interference between the wing surface and the body sides because of the obtuse angle formed. Because of this, higher speed is attained.

Also the gull wing type brings the wing nearer the ground at the point of landing gear attachment, thus making it possible to use shorter landing gear struts. This involves less weight and mechanism.

When considering the fuselage, in the front and side views, we run into difficulties, for here the second consideration is not fulfilled, namely, reduction of frontal area. Though the pilot lies prone, allowing a small crossection area for the forward part of the fuselage, Smith places his motor high above this fuselage, caus-

(Continued on page 38)



AIR WAYS

News of model plane experimenters from all parts of the world

DURING the past few months the ranks of active model builders have been growing thinner and thinner; one by one many names have sunk into oblivion. However now they are "coming to light" again in response to an appeal from MODEL AIRPLANE NEWS.

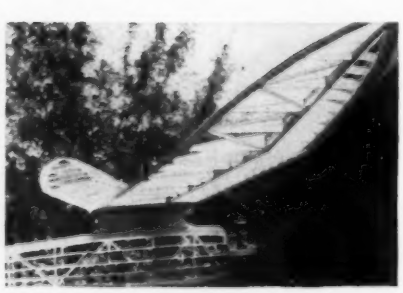
It appears that they have joined Uncle Sam's ranks, either on the war or industrial front. We requested the names of such young men and now are receiving word from them; interesting letters telling where they are and what they are doing. We are putting their names on an Honor Roll which we will run in the magazine from time to time so other builders who are still active in the model game on the civilian front will know where their buddies are. Following are the names we have heard from so far and a few interesting letters.

One comes from Fred M. Staudaher, RT 3/c, R/S. P.S.N.Y., Bremerton, Wash., who says:

"I, too, like many other modelers have packed my mags, manuals, notes and text books, sold my material, and with regret have laid aside my models to serve our country. I suppose like many other builders I want to keep abreast of the trends even though I have temporarily dropped out of the model game.

"But when I got M.A.N., forwarded from home, it left a lump in my throat thinking of the happy days I have spent modeling. I wouldn't trade anything for those 5 years I spent building. First the 10c and 25c rubber models and gradually to the point where I designed my own gas jobs and watched them float away on a lurking thermal. Well, I remember those bitter hours working on a balky motor and how I always kept on trying even though I now know that to have the motor run would be a first-class miracle due to sloppy wiring.

"Now that I have overcome these difficulties, I have a proverb: 'Use a short,



Top 1. Model expert Frank Ehling and his "war baby". *Second from top* 2. Edmund Tierney's Hawk gas job "comes in". 3. Geo. Herbert's beautifully streamlined U-control racer. *Extreme left* 4. A lightweight gas model by Lyle Rosendahl. *Left* 5. Some unique frame construction.

simple wiring diagram, that is easy to inspect and is foolproof.' I remember the hours I spent with my Pacer. This plane taught me plenty of adjustment. Before I could make the last-needed correction it had its fatal day. I flew it in snow 2-1/2 ft. deep and into the summer, and I still say it just needed a few changes to be a swell ship. It must have worked fine at sea level but where I lived it was 5000 feet high and they need: 1. c.g. to be raised to the c.l.a. line and, 2. the thrust line raised. I've seen several Pacers at our altitude and they all needed these changes.

"As you can see I'm in the Navy and I am hoping to either get assigned to radio on a plane or a 'flat-top,' as Aviation is in my blood."

Another letter comes from Pvt. Harold A. Rake of Chanute Field, Ill., who says he is not a well-known model builder so doesn't expect to make the Honor Roll. Well, qualifications for Honor Roll are not based on prominence but what a fellow does in his own quiet way for Uncle Sam. Rake also says that model building experience has helped greatly in his course of aircraft metal work which he is now taking at the Air Corps Technical School at Chanute Field. Yes, we can understand this; in fact, this is one of the reasons that many leaders have worked intensively over the past 10 years in the model aircraft field: these pioneers in education realized the training value of the model plane hobby: we can be thankful that they had no "moss" on their backs.

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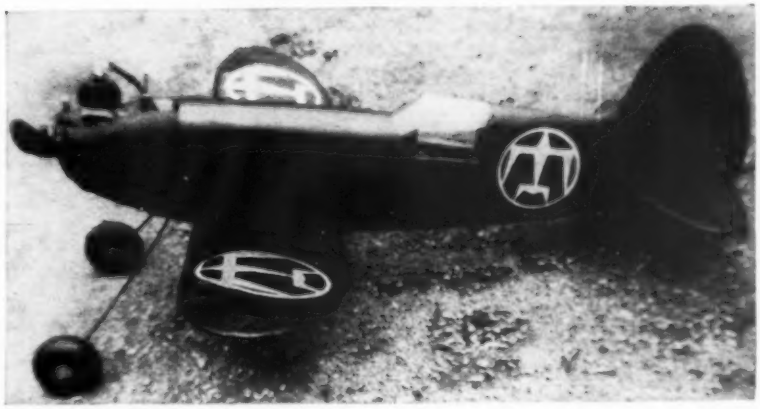

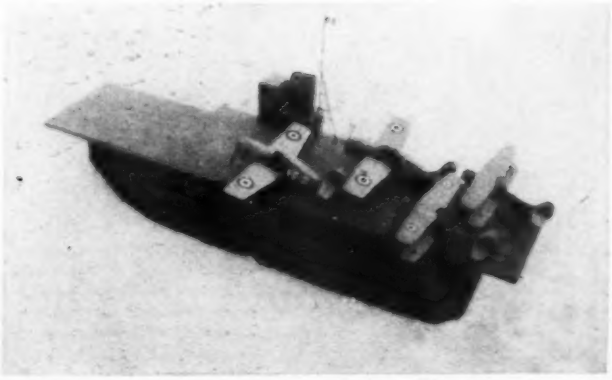

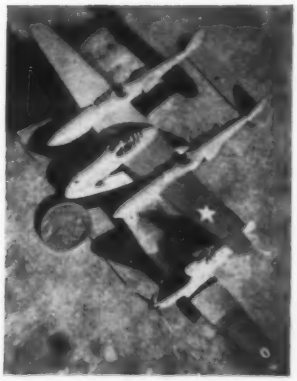

Top left 6. A Grumman Wildcat U-control model. *Top right* 7. V. J. G. Wilkerson builds these scale models for movie shots. *Second from top* 8. Jack Ulstad's G-line plane. *Third row left* 9. Leon Shulman with his new Flying Wing U-control job. *Third row right* 10. Benz and his hardwood gas model. *Right* 11. A model "carrier" with planes ready for takeoff. *Second right* 12. Note the size of these models compared to the nickel.

STRESSING YOUR GAS JOB

Article 3. Forces acting on model aircraft in flight

by LT. J. P. EAMES *and* W. L. NYE

BEFORE undertaking stress analysis of a model airplane the various forces imposed on the craft during flight will be considered. Referring to Fig. 1, we observe that forces acting on model craft are the same as those of a full scale airplane structure, identified as follows:

L represents lift generated by air reaction on the wings.
W represents weight.
T represents thrust provided by forward pull of the propeller.
D represents drag created by resistance of air opposing forward motion.
P represents vertical load on the tail surfaces.

It is not the purpose of these articles to discuss aerodynamics underlying model aircraft design, since this has been done for you in a very satisfactory and interesting manner by Mr. Charles Hampson Grant in the series, "Fundamentals of Model Plane Design" and other articles. We will, however, discuss briefly primary actions of the five fundamental forces defined previously.

Weight of the airplane acts through its center of gravity. The lift force is equal to the weight for the condition of normal horizontal flight at a specific forward flying speed. When the craft is in a climbing position this condition does not, of course, hold true. The combined action of the lift and thrust forces acting together is then working to overcome the weight, or, more properly, force of gravity acting on the craft.

Similarly, thrust and drag forces are equated for the condition of horizontal flight. It is frequently improperly stated that the thrust force at all times acts to overcome the drag. This premise is true only for the condition previously discussed. Should the craft be accelerated or subjected to an increase in forward speed, the magnitude of thrust force does exceed that of drag force. This condition will continue until a condition of stability or equilibrium is reached at a new flying speed. This last-mentioned condition occurs, for instance, at takeoff.

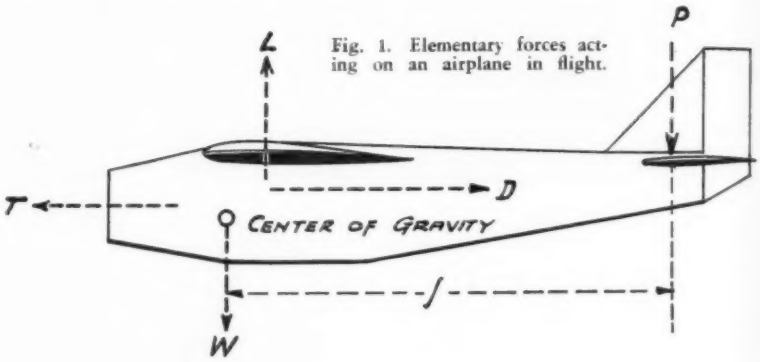

Fig. 1. Elementary forces acting on an airplane in flight.

The lift force acts through the wing center of pressure. The center of pressure is a variable quantity, its position changing with the angle of attack (inclination of lifting surface relative to the air flow). On most conventional airfoils, in normal horizontal flight, center of pressure is located at a point approximately 1/3 the wing chord back from the leading edge. Various flight maneuvers, such as dive or zoom, cause the center of pressure to move in a forward and backward direction respectively. This condition causes increased loads to be imposed on the forward and rear wing spars. As a consequence, wing spars are designed for maximum displacement of center of pressure in the forward direction for the front spar, and in the backward direction for the rear spar.

Actual determination of the extent of center of pressure movement will be discussed in greater detail in subsequent articles dealing with stress analysis of wing forces and loads. Some of the newer airfoil sections, particularly those of symmetrical profile outline, are characterized by a small center of pressure movement. Wings built with the new airfoils can then be fabricated as "monospar," or single spar types, with a resultant appreciable saving in weight. This factor warrants important consideration in the design of larger gasoline-powered models.

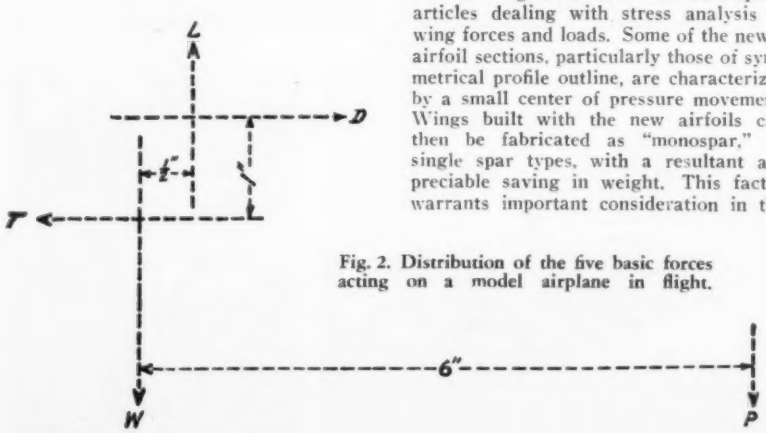

Fig. 2. Distribution of the five basic forces acting on a model airplane in flight.

Drag loads are absorbed by the drag truss which consists of a system of horizontal trussing in the wing structure bays. Drag trusses are of various types, ranging from simple wire truss systems to those of elaborate drag strut construction, and the lattice type of drag bracing employed on large multi-spar wing structures. As a general rule, comparatively short, stiff wings of model aircraft do not require elaborate drag bracing.

Tail load P as exemplified by Fig. 1 is also a variable quantity. In full scale airplanes, the tail load attains its maximum amount during the condition of recovery from a dive. When this condition occurs the fuselage is subjected to a moment of magnitude P x l. P represents tail load, and l represents tail arm length, or distance from the plane's center of gravity to the tail plane center of pressure. Additional loads are imposed on the fuselage structural members under this condition.

Although the force of gravity acting on the airplane structure passes through the c.g., it is advisable to locate the line of action of the lift force a slight distance to the rear, rather than have it coincide with the center of weight. Then, should the thrust force be eliminated, as is the case when the engine is throttled or fails, the airplane will nose downward. Were the lift force to be located ahead of the weight, the airplane under the condition of "power off" would tend to stall immediately because of the resultant decrease in flying speed (unless a lifting tail is used). As a matter of fact, however, in certain large flyingboats lift force is located forward of the weight, although it is to be understood these cases are definite exceptions to the accepted rule for the conventional airplane.

The flyingboats mentioned are constructed in this particular manner simply because thrust line is located high above the hull because of the manner in which

(Continued on page 36)

Flash News

(Continued from page 2)

Forces in Great Britain, is his "kid brother," Captain Carl Eaker, now in the services as a cargo plane pilot. Carl was formerly a Western Airlines pilot and has flown 1,300,000 air miles.

The total score of combined aerial operations of United States aircraft, Army, Navy and Marine Corps, was 2,587 enemy aircraft in 1942 compared with a loss to themselves of only 609 planes, or better than four-to-one!

In the very teeth of the enemy the U.S. has continued to build a string of vital air bases in the Pacific and the last link has just been completed. It is located on Upolu Island in the Samoan Group and the effective range of airplanes operating from it covers an arc including the Aleutians and Australia. About half-way between Hawaii and New Zealand, the vital field has a 7,000 ft. runway, 1000 ft. wide, or capable of landing five fighters abreast!

By day and by night the force of Armed Allied might has hurled tons of destruction on Hitler's Europe since early in February. Royal Air Force Sterlings and Manchesters and U.S. Army Air Force Flying Fortresses and Liberators have slashed at important industrial centers, shipbuilding harbors, railheads and centers, of enemy production in day and night assaults which may presage the long awaited continental invasion. Such a "softening-up" process, if such it is, lays open the path of conquest. The Luftwaffe's power has been broken and the growing aerial might of the Allies presages the day of invasion and eventual reckoning for Hitler and his satellite states.

It has been revealed that for many months British airplanes have been flying over Greece and dropping arms, ammunition, food and supplies to patriot armies hidden in the mountains. The planes fly by night and Athenians send up shouts of encouragement as the planes pass over headed to the North, even though they run the risk of a firing squad.

Captain Clarence Martin of the Marine Corps reveals a breath-taking bit of drama during the fighting days at Guadalcanal. Immediately after the initial Marine landings and capture of Henderson Field, the Marines ran perilously low on ammunition with no hope whatever for aid from land or sea. Just as the Japs moved forward to retake the field and possibly thrust the Marines back into the ocean, three cargo planes roared over the field from the South and dropped crate after crate of ammunition. The vital role now being played by air supply could be no more vividly pictured than this action.

The Collier Trophy for 1942 has been awarded to the United States Army Air Forces and the combined airlines of the nation "which laid the foundation, then built the world-wide transportation system which has proved the salvation of our air forces in the field." Colonel Edgar Gorrell accepted for the airlines as president of the Airline Transportation Association and Lieut. General Henry H. Arnold, Chief of the Air Forces, accepted for the Army Air Forces. The 32-year-old award is given each year for "the greatest achievement in aviation in America."

The OWI has released information on the mysterious "modification centers," a string of re-work facilities throughout the nation operated by airlines, aircraft factories and Army Air Forces. Due to the varied locales in which our military airplanes serve and the impossibility of determining beforehand where a particular airplane is destined, production models are rolled from the factories identical, one with the other. These are then flown to certain modification centers which install necessary equipment, apply required camouflage and make all additional adjustments required. Those headed for Alaska, Iceland or Russia are fitted with special cold-weather apparatus. Those headed for Africa, Guadalcanal or India are given special camouflage jobs and necessary equipment for desert and high-temperature operation. This string of "tailor shops" has speeded a hundredfold the process of readying our airplanes for combat.

The Army has purchased three helicopters, it has been announced, two Sikorsky SV-300's and a Platt-LePage model. They will be used for experimentation.

The Navy is now testing a Bristol XLQ-1 twelve-place flying boat glider. It has a 72 ft. wingspan, is 40 ft. long. The wooden craft is a low-wing monoplane and can be fitted with wheels for land operation as required.

A story of heroes in action was told recently. But these heroes wore only plain civilian garb and won no medals for their deed. When rising waters threatened to inundate more than 100 Army L-4 and Navy HE-1 Piper Cub liaison planes at Cub-Haven Airport, 16 Piper pilots hurriedly took off in absolutely zero-zero flying weather and raced the ships to higher, dryer ground. Immediately after landing his ship, the pilot would hurry back to the airport in an automobile and take off with another plane. The entire group of airplanes was saved and are now in service.

Changes in personnel: Paul E. Richter, Executive Vice-President of TWA, has donned a Lieut. Commander's uniform and is now flying for the Navy. E. Lee Talman, formerly assistant-treasurer of Bendix Aviation Corporation, has taken Richter's place.

The Companhia Nacional de Navegacao of Brazil is now in production on 1000 training planes known as the HL-6. The trainer weighs 1640 pounds and is built entirely of plastic-bound plywood with exception of the Franklin air cooled engine and attaching parts.

The famed Curtiss SB2C-1 Helldiver (Model Airplane News, July 1941 issue) is now going into service with the Army Air Forces. Known as the A-25, it is identical to the Navy model and changes may be made in the field to convert the plane for use from one service to the other.

The giant Martin Mars flyingboat is now in production as a cargo plane and has been stripped of its turret and torpedo-bomb installations. More powerful engines have been fitted and the plane will go into service on long-range cargo routes supplying vital materials and supplies to our far-flung battle lines.

Barton T. "Red" Hulse, Ace Curtiss test pilot, has been promoted to the company's New York research division, a newly established branch of the Curtiss-Wright Corporation.

The ability of a P-39 Airacobra to take heavy punishment was demonstrated when Staff Sergeant Paul H. Wilkins, 20 years old, "blacked" after a long dive and the 'Cobra hit a telephone pole at the bottom of its pull-out just 20 feet from the ground. The wing was sheared up to within 12 inches of the fuselage, the propeller was bent into a corkscrew and all engine controls were knocked out. However, the 'Cobra zoomed back up to 1,000 feet, still in one piece, and Wilkins bailed out, landing safely in a prune orchard 7 miles from the telephone pole.

That the Army's new flight strips are useful has already been demonstrated when a heavy bomber, unable to locate a landing field in heavy weather, landed on a 7000 ft. concrete strip adjacent to an unnamed highway in the East. On another occasion, a doctor was flown into an inaccessible region, the landing being made on a flight strip lighted by Army trucks, where he saved the life of an enlisted man.

Soldiers of the Army Air Forces Flexible Gunnery School, the Air Base Squadron and Base Headquarters at Tyndall Field, Florida, have pledged 100 per cent for purchase of War Bonds, the War Department announces. Most of these men are privates with a base pay of $50 per month.

Details of the important part played in the Libyan theater by U.S. Army Air Forces fighter units which destroyed many enemy aircraft in action during the opening weeks of the Rommel rout have been reported to the War Department by Brig. General Elmer E. Adler, second in command of the 10th Air Force in India and later the 9th Air Force in the Middle East, now on duty in Washington. For the Libyan campaign the 9th Air Force was organized as two task forces and attached to the British Royal Air Force. These forces, the Desert Task Force and the Heavy Bombardment Task Force, struck many hard and effective blows in the battle which has driven the Fascist armies in headlong flight from Egypt to Tunisia. The aerial offensive in which United States fighter pilots and planes with the Desert Task Force participated resulted in almost complete destruction of German and Italian Air Power in the desert during a major part of the campaign. Observers have reported that for days they had not seen a single enemy plane over the British 8th Army during its advance through Libya. The Heavy Bombardment Task Force during this same period gave "a marvelous demonstration of air support of a ground army," General Adler said. Its continuous assaults on Fascist shipping, ports and dumps on both sides of the Mediterranean and its sea lanes "probably contributed more to the defeat of Rommel than we can yet realize."

VICTORY

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AIR YOUTH

(A Division of the National Aeronautic Association)

Official Model Airplane News prepared by H. W. Nichols

AMA Sanctioned Meets for 1943

MODELERS throughout the country are "keeping 'em flying" despite transportation difficulties, gas rationing and priorities on model airplane materials. Although Atlanta, Boston and Philadelphia seem to be taking the lead, sanction applications are coming in from other parts of the country as well.

The Philadelphia Model Airplane Assn. is holding a series of contests in Convention Hall for club members. Prizes consist of ribbons, merchandise and points toward the season championships. Contests are being held under the able direction of Miss Anna Pike Haas, AMA Leader Member.

In the midst of the August heat wave, back in 1942, Mr. W. R. Roberts made application on behalf of the Atlanta Aero Engineers for a series of gas model meets. Over 20 members of that club are building up points toward winning the coveted club trophy.

And Boston is not only tea-partying! The Boston Traveller—Jordan March Junior Aviation League is as active as ever, and has already received official sanction for its January, February and March contests. Held at Boston English High School, most of the contests are club affairs for scale and Guillow models.

Chirping robins and the Ann Arbor Model Flying Club will hail the first day of Spring on March 21 when an AAMFU all-control contest will be held in the U. of Mich. Field House with prizes totaling $150 in value. The contest director is Mr. R. L. Painter.

JAR Flight 81 Studies Rickenbacker Flight as Problem in Navigation

Several weeks ago when Capt. Eddie Rickenbacker gave a full account of his flight and miraculous rescue, JAR Flight No. 81 of Central High School in Newark, N.J., recognized an excellent problem in navigation. Flight Officer Rocco A. Misurell discussed briefly map projections of the world and demonstrated the Lambert projection. Said Flight Officer Misurell, "On the basis of time, the Rickenbacker flight started at 1:30 A.M. and at 10:30 A.M. they were definitely lost. On a map, we showed how far over the Samoans he had gone and either to the east or west of the Islands because they had failed to swing their ship. In this problem we assumed that the deviation was in error, that the deviation was about 5° east or west, and the cruising speed of the B-17 was 275 mph. The navigator used a 10 mph tail-wind whereas actually it was 30 knots per hour or about 36 mph. Hence they overshot their mark as well as missed it either east or west by about 200 miles. Here was an ideal problem of navigation which was highly impressive to teach. On our map we actually traced the intended course and the actual course."

Activities in which Flight No. 81 have already taken part are as follows: Lecture and demonstration of the International Morse Code, work on oscillators, gliders, lecture on theory of flight, lecture on aerodynamics, problems in navigation, and a trip to Casey Jones School of Aeronautics.

Plans are being laid for a second Flight at Central High School, and under the able leadership of Flight Officer Misurell, it promises great success.

Boy Power

Progressing most favorably is the "boy power" experiment being conducted at Lockheed and Vega Aircraft Corporations, where boys between the ages of 16 and 17 years are being used as half-time aircraft builders. Under what is called the four-by-four plan, each boy attends school for four weeks and then builds airplanes for four weeks. Thus 500 boys will alternate in filling 250 jobs on the assembly lines.

Hiring is done through the school system and parental consent is necessary. Robert E. Gross, Lockheed President, stated that the boys will work eight hours on the day shift only and that school superintendents observe their work in the factory just as in the schools. Especially thorough will be their training in safety methods. Meeting every requirement of the State Labor Board, the four-by-four plan offers an opportunity for these boys to complete their educations, to relieve the manpower shortage and earn regular wages in vital war production work. Most of the 16 and 17 year olds are used on actual assembly work, and are shifted periodically from job to job during the training period, thus giving them a broad background and an opportunity to find the type of work for which they are best suited.

To assist the plan, the school year has been extended to 12 months and each of the boys must keep up his scholastic grades in order to hold his job. To further cooperate, Burbank high schools have streamlined their curriculum in order to permit these worker-students to pass three years of high school work in two and one-half years. Credit is given for factory experience.

Expansion of the boypower plan rests entirely upon the degree of success obtained by this first group of student-workers. If the test period proves as successful as present progress indicates, Lockheed and Vega officials plan to put thousands of teen-age boys to work. Watching this experiment with a great deal of interest are several other aircraft manufacturers and it is expected that similar plans will appear soon in other plants.

Balloon Bursting Event Highlight of Michigan Contest

A highlight of the Detroit Schools Indoor Model Airplane Contest to be held at Cass Technical High School Auditorium on April 17, 1 to 5 P.M. will be the "Balloon Bursting Event!" A series of balloons will be suspended from a string stretched across the auditorium, and contestants will attempt to strike and burst the balloons with their planes. A prize will be given to each boy breaking a balloon. Sounds like fun!

Other events in the contest, which is open to youngsters of school age, are ROG Indoor Fuselage, Indoor Stick and Indoor Glider.

Beginning with the February semester each of the twenty intermediate schools in Detroit is opening a class in model airplane building which will meet one hour a day, five days a week. Regular school credit is given for the classes.

Gas for Model Planes

An OPA official said the other day that the gas rationing regulations will permit modelplane builders all over the country to keep 'em flying as long as it is humanly possible. Because, he said in answer to an inquiry, it is the experience of building and flying such models that has often made the difference between victorious American pilots and vanquished enemy pilots.

Pointing out that the amount of gasoline involved is relatively small, an OPA spokesman said the nation's model builders already have done a great deal for the war.

"In many cases, these youngsters are teaching their parents how to spot enemy aircraft and how to distinguish between bombers and fighter planes," he said.

Former AMA-er Serves at Midway

Lt. S. H. Whitten, USMC, a former licensed AMA model flier and member of the Jordan Marsh-Boston Traveller Jr. Aviation League of Boston, Mass., who recently served at Midway, sent the following message to New England boys and girls:

"I came to love flying when making models and flying them in the Jordan monthly contests. I learned practical engineering that can be applied to large planes directly from models. And the competition of contests helps in building a desire to win, to keep going until men and planes stop . . . Maybe some of the fellows (gals, too) can be told that learning by doing is the only way to learn well . . ."

Lt. Whitten, Squadron Flight Officer and Division Leader, should know; several weeks ago he was decorated with the Navy Cross. We would like him to know we're proud, too.

Allentown Model Cadets Elect Officers

The following officers for 1943 were elected at the last meeting of the Allen-

(Continued on page 36)

Build This Flying "Jeep"

(Continued from page 17)

tics of the real ship; construction is easy, and flight performance is matched only by attractiveness. The field plane is "sand and spinach" while the trainer version is painted all silver. This is how to construct the model.

FUSELAGE: Before starting, the fuselage plans should be joined; incidentally, if you do not want to mar your magazine, make tracings of plans on semi-transparent paper.

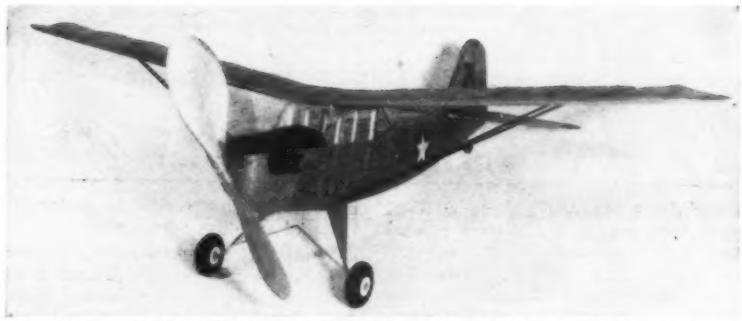
First make the fuselage underframe of 1/8" sq. balsa longerons and cross-pieces, indicated by light shading. Note that the cross-pieces behind the wing position are 1/16" x 1/8" balsa. Make two side frames, one atop the other for identity; cement will probably cause them to stick together but they can be separated by razor-blade. When dry invert the side frames over a complete top view plan and join with cross-pieces at the cabin. Next pull the backs together and add remaining crosspieces in the rear. Crack the longerons just in front of the cabin to pull the sides together as shown. Check continually for correct alignment.

Now cut the fuselage formers to shape. Bulkhead A is 1/8" sheet while the remainder are cut from 1/16" sheet balsa. Cut the notches shown and cement to position. All stringers are 1/16" sq. balsa, except the stringer on top the fuselage that runs into the rudder. Note that there are two 1/16" sq. stringers running along the fuselage bottom. Sand the ends of the stringers so that they fair smoothly into the fuselage contours.

Cover the nose with soft 1/32" sheet balsa. Care must be exercised here. Use the widest sheet available; cement it to the entire adjacent frame using pins and rubber bands to hold it in place until cement has set. Extreme front of the nose is heavy sheet balsa, as shown. Roughly cut to shape, cut out a hole for the nose plug, then cement it to the fuselage front. When dry cut the block to a smooth shape, then sand the entire nose to shape.

Bend the two landing gear struts to shape and size shown, from .040 music wire; attach to fuselage by neatly binding with thread and then applying several coats of cement. Join bottoms of the struts by winding with thread and cement. The 1/16" sheet fill-in can be cut and fitted but should not be attached until the fuselage is covered; the center struts likewise.

WING: Make full size plans of the right and left wing halves so parts can be assembled directly over them. Cut all necessary wing ribs from 1/16" sheet as shown in the plans. The wing should be assembled in one piece and then cracked at the center section for necessary dihedral. Pin all ribs together and sand to uniformity, then cut the notches with accuracy. Pin the 1/8" x 3/8" trailing edge and the 1/16" x 5/16" center spar in place on the plans. Pin the 1/8" x 1/4" leading edge into position also but note that it must be blocked up about 1/16" to meet the rib contour. The leading and trailing edges should be cut and sanded to shape prior to pinning to the plans. Insert ribs in their proper locations and cement firmly. Note that the center section trailing edge is blunt edged 1/8" sheet. Cut the wing tips from 1/8" sheet and sand to the proper crossection. When dry remove from the plans and crack to 1-3/8" dihedral under each wing tip. Note that the portion of the wing over the fuselage is flat. Check for warps.



Dummy engine cylinders and carefully made wheels improve appearance

With line decorations, insignia and transparent cabin windows it looks like the real thing

A pair of wing struts is next made: the struts are shown in the broken lines on the wing plan. They are made from 1/16" x 1/8" members sanded to a streamline crossection. Struts are not installed in place until final assembly.

TAIL SURFACES: Tail surfaces are very simple to construct, and are built directly over the plans. As shown, the stabilizer is fashioned in one piece for strength.

Leading edge and center spar of the rudder and stabilizer are 1/8" sq. while tips and trailing edges are cut from 3/32" sheet balsa. Ribs are 1/16" x 1/8". Build a flat frame by pinning these members in their proper positions over the plans and cementing firmly. When dry remove and trim leading and trailing edges with a razor and sandpaper to the required crossection. Rudder and stabilizer are not cemented in place until after covering.

PROPELLER: To obtain fine flights from any model the propeller must be efficient. Select a hard block of proper dimensions and cut the blank to shape shown. Drill the tiny hole for the prop shaft, then carve a right-handed propeller, by cutting away the back face of the blades until there is about 1/16" undercamber in each. Make each surface smooth and uniform with sandpaper. Blade thickness is then easily determined as the front is shaved away. Thin the blades as much as possible, still retaining desired strength. Round the tips like the prop shown in the photos. Carefully sand and balance the prop as the final operation. Several coats of light dope, if sanded lightly between each, will produce a very smooth surface. A freewheeling gadget to improve glide should be attached to the front and a bearing to the rear. Prop shaft is bent from .040 music wire.

The nose plug is trimmed to shape from hard 1/4" sheet with a small cube to fit into the front of the model.

COVERING AND ASSEMBLY: Before the frames are covered they must be lightly but thoroughly sanded to remove any flaws or roughness that might mar the covering job. Colored tissue is used, banana oil or light dope is the adhesive. Use individual sections of tissue for each flat section of each side of the fuselage, wing, tips, tail surfaces, etc. Work carefully to assure a neat job. Lightly spray covered parts with water to tighten the tissue. The flying surfaces must be supported level while drying so they will not warp.

Assemble the covered parts in this manner: Fit the wing on top of the fuselage and cement it firmly. If the structures have been made with accuracy, incidence will be correct. Cut the windshield pattern from celluloid, as shown, and cement in place. Build the observation station behind the wing and cover the entire cabin with thin celluloid. Landing gear fill-ins, made previously, are cemented to the wires. Cover the whole landing gear with colored tissue. Color the wing struts black and then cement in place. Cement the stabilizer in place, making sure it is parallel to the thrust line. Now add the rudder. The entire model is now given a coat of clear dope.

Now for more minor details. The four cylinder engine offers plenty of possibili-

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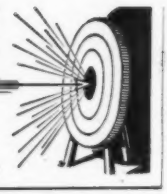

Dealers Wanted

ACE MODEL PLANE CO.

3149-M Shenandoah St. Louis, Mo.

ties for detail. Control surface outlines, insignia, etc. are all made from colored tissue. Tail wheel and similar parts are made from scrap material. Make the wheels from laminated balsa and paint the tires on with flat black dope. Anti-glare cowling is dull black dope. More details may be found in the photos.

FLYING: Six to eight strands of 1/8" flat brown contest rubber should be used to power your Taylorcraft, depending on the weight of your individual model.

Give the propeller a few turns and hand-launch the model in deep grass, if possible. A small lead weight in the cowling will counteract any stalling tendencies. Should your model be nose heavy add a small weight to the tail. Warping the tail surfaces is not advisable as they may change from flight to flight. Once balance is obtained, increase the turns gradually, feeling out the characteristics of your own ship.

The original model balanced very neatly on its first test flight; the climb was fast and the glide a real "floater" due to the general set-up of the plane.

On the whole, the model is very simple to construct and fly. And the Taylorcraft is a dandy flying scale for your collection—and just to get that extra duration, don't forget to use a good winder and rubber lubricant.

VICTORY

Stressing Your Gas Job

(Continued from page 30)

powerplants are mounted. Since the greater part of their drag is concentrated in the hull, the flyingboat's high thrust line tends to create a nosing-over condition which must be compensated in some manner. Locating the lift force so far forward results in development of a nosing-up tendency which fulfills the required condition and maintains the craft on an even keel when engines are running and a thrust force is being produced. An exactly opposite condition occurs with a conventional airplane. Since a nosing-over tendency already exists, due to weight being located ahead of lift force, some form of compensatory device must be incorporated in order to keep the craft longitudinally stable. Consequently, the thrust line is located below the line of action of the drag force as is indicated in the drawing of Fig. 1. The resultant nosing-up action serves to perform the required function adequately.

As a practical problem, let us determine the relative amount of tail load P in a model airplane that weighs 6.25 pounds. As a further assumption, let the lift-drag ratio for the model structure be 10. Distribution of the five elementary forces acting on the craft are as indicated in the drawing of Fig. 2.

Taking moments about point O, the intersection of lines of action of the weight and thrust forces, we have:

$1/24\ L + 6P = 1D$

$L + 144P = 24D$

But $L + P = 6.25$ pounds, assuming both the tail and main planes contribute to the total lift.

$143\ P = 24D - 6.25$

But $D = 0.625$ since the L/D ratio = 10

$143\ P = 15 - 6.25 = 8.75$

$\therefore P = .0611$ pounds acting upward for the condition of normal horizontal flight.

The tail load will be found to act downward under certain flight conditions. In general, the action of the tail load will not prove to be a considerable consequence in the case of smaller models. As is seen from the selection example, tail load possesses a magnitude of approximately one ounce. However, the magnitude of this quantity will increase drastically with certain flight attitudes of the craft, so that in the large gasoline-powered models the designer will be justified in including it in his computations.

VICTORY

Air Youth

(Continued from page 34)

town (Pa.) Model Cadets: President, Howland Buzby; V.P., Ralland Miller; Sec., Donald Seyler; Treas., G. Reitenauer; Trustees; Lester W. Heckman, Jos. Smith, Harold Dratzer; Senior Advisor, Palmer Moyer.

Crippled Youth Essential War Worker

At the request of the Navy Department, Eero Koskinen, Finnish-born victim of infantile paralysis for 11 of his 16 years, left his studies at the Teaneck, N.J., High School recently to become an essential worker in a war plant in North Bergen, N.J., where he will build model airplanes for testing wind tunnels.

After he lost full use of his legs at the age of five, Eero began building models. News of his exceptional skill reached the ears of Naval authorities who waived regulations to obtain his services in secret experimental work under Navy Orders.

JAR Recognizes New Flight

JAR Headquarters has announced the formation of a new Flight, No. 86, in Philadelphia. The Flight Officer and founder is Miss Anna Pike Haas, active AMA Contest Director and Leader Member, Associate Director of the Philadelphia Model Airplane Ass'n., and a teacher of aviation in the public schools. Application for recognition of Flight No. 86 was made December 7, and Miss Haas designated the Flight as a "Remember Pearl Harbor" Flight.

The Flight Cadets are: Edward Fauser, Flight Leader; Robert Wunder, Ass't. Flight Leader; Richard Burd, Albert Lar, Marylan Fauser, Don Aliver, Bob Stephens, Walter Stairs, Edward Leva, John Bretherick, Samuel Wylie, Richard Hansberry, Edward Yuengling and Leo Mindeijohn.

Flight 34 Completes First Training Course

In a recent report of activities to JAR Headquarters, Mr. L. N. Perkins, Flight Officer of Flight No. 34 at Hershey (Pa.) Industrial School outlined the following study program which his group has completed.

Theory of flight, famous men in aviation, gliders, nomenclature, identification of war planes, construction of solid models (for Government use), meteorology, Air Youth construction kits Nos. 2, 3, 4 and 5, a notebook on lectures and a scrapbook on aviation. Model airplane meets have been conducted in which Flight members participated.

AMA Announces 1943 National Officers

For the first time in the history of the Academy of Model Aeronautics, the election of national officers was held by mail ballot; ordinarily the nomination of officers is carried out in conjunction with the annual national contest. In cooperation with the Government's request that transportation be limited to defense travel only, the Nationals were cancelled for 1942 and the duration of the war.

Leader members, licensed fliers and all interested model enthusiasts submitted nominations to the Nomination Committee members in their district, who based his nomination on the desires of voters in his district.

A candidate was named from each of the eleven AMA districts for the offices of President, District Vice President and Secretary-Treasurer. The following names appeared on the final ballot: President—Edward Roberts, Philadelphia; Irwin Ohlsson, Los Angeles; R. H. Webber, Chicago; H. F. Auler, Milwaukee; Nevilles Walker, Portland, Ore.; Leo Rutledge, Wichita, Kan., and Ted Britcher, Seattle.

Vice Presidents—District I, Willis Brown; District II, Leon Shulman, E. N. Angus, and Ed Yulke; District III, Bob Reich; District IV, George Geil; District V, Elmer Wasman, W. T. Thomas; Dis-

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FLYING
WARPLANES
95¢
Names
that are making
AVIATION HISTORY...
CORSAIR, WILDCAT, SKYROCKET, LIGHTNING, SPITFIRE . . . these are names that are writing history in the skies . . . .and all, plus many more, are among the 95c Megow Flying Models that every model builder wants today!
With 30-inch wingspan, they are impressive in size, fascinating in design . . . and boy! the way they fly! Easy to build, too . . . with Megow plans that picture every detail.
Build a few of these Megow Warplanes now—develop your skill with tools and learn more about aviation, while you familiarize yourself with the air fighters of the great warring nations. See them at your dealer's, or write direct to us
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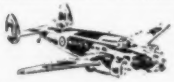
What kit by Cleveland do you want? We carry the complete line. Order today and start building and you'll know what "keeps 'em flying." Model builders are helping to win the war.

Fly models now for tomorrow you may be flying real planes.

AN55—JUNKERS STUKA the Nazi dive bomber; span 34"; complete kit $3.50

AN57—DAUNTLESS the tough bomber; won spurs at Midway; 30⅜" span....$3.50

AN60—LOCKHEED LIGHTNING, famous P-38; fast as lightning; doing a big job $4.00



AN56—LOCKHEED HUDSON our powerful bomber; big 49¾" span; complete kit $7.50

AN61—Bell "Aircobra" $3.00

AN62—Curtiss P-40.... 3.00

AN63—N.M. Mustang .. 3.00

AN64—V. S. Corsair.... 3.50

AN65—Messerschmitt.. 3.00

AN70—British Spitfire 3.00

AN58—BREWSTER BUFFALO the peanut special; span 26¼"; complete master kit $3.00

AN59—REPUBLIC THUNDERBOLT—a flying battleship; span 30¾"; complete kit $4.00

AN38—SUPER CONDOR, newly designed 7-ft. soaring glider; soars for hours; largest plane in the world for $1.00

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AN22—The busiest car on the battle front; a compact model with movable wheels and windshield, makes up into a superdetailed replica. Kit includes cut-to-size parts, necessary hdw., full size plans and instructions. Kit..... **60c**

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U.S. ARMY CARGO TRUCK; complete kit.....$1.50

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With Blade **50c**

AN33—Sharp "as a razor" X-acto knives. Make cutting easier, faster, truer. Blades instantly changeable.

AN34—X-Acto Combination Set includes 2 knives 12 blades $2.00

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AN11—6 Airplane catalogs: Cleveland, Berkeley, Hawk, Ideal and Scientific; all for one price 25c

Enclose 10c postage.

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Immediate Delivery

AN66—CURTISS P-40; deluxe model; 9⅛" span....75c

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AN68—LOCKHEED P-38; 11" wing span; complete.....50c

AN68—WRIGHT-SIKORSKY F4U1; 10" wing span; complete 50c

AN69—BREWSTER BERMUDA; 11" span; complete. 50c

AN27—SUPERMAINE SPITFIRE; complete 50c

AN30 — BELL AIRACOBRA; P-39; complete 50c

AN31—MESSERSCHMITT, 109-F; complete 50c

AN40—JAP ZERO; ¼" scale; sugar maple 35c

AN51—SINBAD the SAILOR; 30" span; $1 plus 15c postage

Camouflage, $1

7 bottles of varied camouflage colors with instruction booklet.

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trict VI, Ed Linthicum; District VII, Robert Tost; District VIII, John Clemens; District IX, Jack Moralez, District X, Irwin Ohlsson, William Butler; District XI, Elmer J. Roth.

Secretary-Treasurer—Irwin Polk, New York City; H. M. Schreiber, Kansas City, Mo.; Carl Goldberg, Chicago; Bill Brown, Lincoln, Nebr.; and Russell W. Nichols, Washington, D.C.

Space was provided on each ballot for the voter to list an additional candidate for each office if he so desired. In his way, each Leader Member cast his ballot for the candidate of his own choice.

After a careful tabulation of the ballots the following Academy of Model Aeronautics Officers for the ensuing year are announced:

President—Irwin Ohlsson; Secretary-Treasurer—Russell W. Nichols; District Vice Presidents—District I, Tom Wildon; District II, E. N. Angus; District III, Bob Reich; District IV, George Geil; District V, W. T. Thomas; District VI, Ed Linthicum; District VII, to be announced; District VIII, John Clemens; District IX, Jack Moralez; District X, William Butler, and District XI, Elmer J. Roth.

In order that the members of the Academy of Model Aeronautics may become better acquainted with their officers *Model Aviation* plans to publish a series of articles introducing an officer each month.

(The District Vice President of District VII will be announced at a later date by AMA officials, as the eligibility of the candidate submitted is in question.)

How to Form an AMA Club

The AMA Chapter Handbook gives complete directions for the establishment of a model airplane club with various organizational steps, detailed and suggested by laws included. An entire section is devoted to sources of program materials with listings of motion pictures suitable for model clubs. Available from headquarters for 50c.

VICTORY

Tips on Tips

(Continued from page 9)

then somewhat slower as full elliptical wing is approached, although it is still increasing. This would indicate that the elliptical wing possesses higher aerodynamic efficiency than any other types, and that any model equipped with this type wing would have better climb, and much better gliding characteristics than with any other type wing.

Some of the above comments apply only to model airplane design, since the speed of models is very low. On full scale airplanes the elliptical wing is still theoretically the most efficient, but increase in overall efficiency is not great enough to justify the much greater manufacturing costs. Remember that on an elliptical wing the construction of a separate jig and assembly for each rib is required. This makes cost much greater than for a wing in which the same jig and assembly can be used for the whole thing, or at least the whole wing except for tips. On the model however, construction of an elliptical wing requires only a little more labor on the part of the model builder, and hence is absolutely justifiable and desirable.

Using a wing with elliptical design equal to 6.0 times the chord is also the equivalent of using a tapered wing, as a reference to Fig. 2 will indicate. That this is also highly desirable has been repeatedly proved in numerous wind tunnel tests. The exact amount of taper has sometimes been questionable, but it is now generally agreed that a taper with tip chord equal to one-half the root chord is the most efficient, both from drag and lift standpoint.

Several tests have been run on the comparative characteristics of a completely elliptical wing and a trapezoid of one-half taper superposed on the ellipse. Within the limits of experimental error, the trapezoidal wing has characteristics which are only 1 1/2% to 2% poorer than the elliptical wing. This would indicate that on all but contest models where it is desired to take advantage of every possible improvement, the trapezoidal or straight taper wing is just as good as the completely elliptical wing, which is harder to construct.

The effects of planform design are also closely related to the wing aspect ratio. The majority of these preceding comments apply only to wings of aspect ratio equal to six, or slightly greater. Some appreciable improvement can be obtained in both lift and drag characteristics by increasing the aspect ratio, but for model work a wing aspect ratio higher than eight is hardly worthwhile. The aerodynamic aspects of high wing ratio can be judged by studying flight characteristics of some of the high-performance sailplanes; these gliders have had ratios as high as twenty, and are very efficient.

VICTORY

Airplane Design Forum

(Continued from page 27)

ing extra forward frontal area. This is a serious mistake. Obviously the motor should be dropped so the propeller shaft is on a line with the pilot. Then the motor could be housed in a small fuselage with less frontal area. It would be streamlined from the nose backward smoothly over the pilot and motor to the propeller.

Also the thrust line would pass closer to the c.g. of the airplane; this would have considerable bearing on its flying qualities and maneuverability. With the weight and thrust placed high the ship might have a tendency to be erratic.

In other aerodynamic respects the ship is excellent, especially the idea of a pusher propeller and twin rudders.

Structurally, however, we run into another difficulty. In the planform the booms are shown attached to the center nacelle, forming a 90 degree angle just forward of the propeller. Such an arrangement could not be tolerated and would result in tail flutter and even worse —complete breakage at the point where the right-angle booms join the fuselage. Any pressure on the tail would cause great torsion in these lateral booms just forward of the propeller. To withstand the stresses they would have to be too heavy to be practical, detracting seriously from

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It shows the different methods of pinning and cementing.

It gives three methods of building fuselage frames.

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It tells how to cover fuselages with flat sides and those with curved surfaces.

It shows how to assemble low, mid and high wing monoplanes.

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It shows how to check the alignment.

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These two books and a full size plan of our new Pilot Trainer 50¢ Postpaid

PAUL K. GUILLOW, Wakefield, Mass.

the performance of the airplane. Such a plane would fly through the air with the tail "waving a fond adieu" in all directions and eventually tail and plane would part. We wonder why Smith has not carried the booms forward to the wing center section, attaching them rigidly to the rear spar. This may not be so unique but certainly much more satisfactory.

Another important error is noted. With the wings forward relative to the engine, as shown, the center of pressure would be too far ahead of the c.g., causing an extreme stalling tendency. In fact, the airplane would not fly with the wings forward as indicated. The c.g. of the fuselage, engine, tail, etc., is approximately at the forward engine exhaust pipe (shown on the drawing).

To be properly balanced the wing should be placed so that a point 25% of the chord back from the leading edge would coincide with this c.g. point. In other words, the wings should be moved backward, from the position shown on the drawing, a distance equal to about 3/4 the wing chord. This would require a much longer tail arm for stability and a rearrangement of the entire airplane and illustrates clearly how one error can affect the rest of the design and make it entirely impractical.

Next month we will discuss other problems—so if you have any "pet designs" we suggest you send them in for careful analysis of their practical values and enjoyment of other readers.

VICTORY

"Thermo" Contest Winner

(Continued from page 25)

Counter-weight wire is bent from No. 40 wire as shown. By wrapping paper around a pencil a perfect mould may be had for pouring hot lead around counter-weight wire. This should be overweight to allow for scraping to balance prop. Counter wire is sunk in prop hub, bound and glued.

Prop should be treated as follows: apply one coat of cement, working into pores well. After sanding lightly apply two coats of clear dope and three or four coats of silver with intermediate sanding. This results in a strong and sparkling blade. Prop now should be balanced. Prop shaft is bent by starting at "S" hook. After assembling prop shaft, nose block, etc., put your wood screw in such a position that it will stop prop on left side of fuselage.

COVERING: Sand all parts lightly and cover with tissue. Good colors to use are red and yellow, yellow and blue, green and orange, or all red. Cover underside of wing first, adhering tissue to under-camber of each rib. You need not glue to each rib on top of wing. Spray and weight down each wing panel separately to prevent warping. Elevator and rudder should also be weighted down after spraying with water.

Spray fuselage and when dry give three coats of clear dope. Rudder, elevator and wing should be given one or two coats of clear dope.

MOTOR: Motor consists of 18 to 20

BEST BY TEST MODEL CO.

Announces the Sensational

New "DETHERMALIZER." No more lost ships. You'll marvel at its accurate simplicity. Weight 1/20 of an ounce. Nothing to go wrong. Not affected by heat, cold or altitude. USE on RUBBER OR GAS. Proven coast to coast. 25c P.P.

MODEL BUILDERS—if you build gas, rubber or solids—get our new price list, 5c.

You CAN Fly.... WITH 30-ft. 3/16" Brown Contest Rubber with each kit.

(No cardboard in these kits)

STRATOMETER 36" span

ALTIMETER 36" span

Each Kit with Rubber..$1.95
Each Kit without Rubber $1.50

ADD 15c packing and postage on each kit. 5c more insures it.

(The above prices effective April 1, 1943)

WHAT YOU GET

Finished wing and stabilizer ribs, trailing edges, finished drilled and tapered nose plug of balsa. Colored AAA tissue, B.S.T. cement, steel wire, stamped dowel plates, 14" machine cut prop. Plenty of balsa strips and giant plan included. Stratometer has finished sheet sides of choice stock. Altimeter has finished landing gear with wheel attached. Finished steel motor hook.

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RIDGEFIELD PARK, NEW JERSEY

Easier!
F-A-S-T-E-R!
MORE ACCURATE
THOUSANDS OF CLEVER USERS SAY THIS OF the
X-acto
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Everything PLUS... that's what these revolutionary knives have! New hand-comfort — new "never-before" keenness. Eight instantly interchangeable blades make two models (Nos. 1 and 2) "custom built" for any whittling or carving job.

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Just four parts — the solid handle, the hollow sleeve, the split collet, the world's keenest blades. SLEEVE: ¼ turn clockwise releases blade. Unscrew sleeve, slip off and see split collet, which grips blade, like lathe collets grip work.

HANDLE COLLET BLADE

Collet taper shows why only ¼ turn of sleeve loosens or tightens blade. Fast? You'll say so!

Get your X-acto today..at local hobby shop, hardware or department store or order direct!

No. 1 X-ACTO knife for light, delicate work, complete with one blade. 50c.
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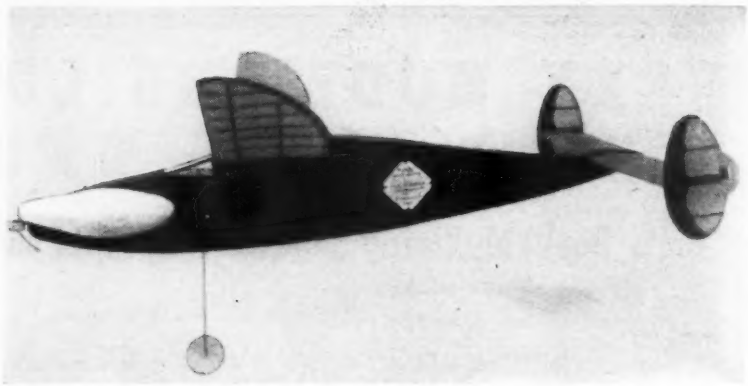

A single blade propeller gives efficiency in climb and low drag when gliding

strands of 3/16" rubber, 46" long. Lubricate well, then wipe off excess lube. A good lube is one part green soap and one part glycerine. Divide motor into two groups and wind each 25 turns and tie small rubber band one inch from the end to form eye in motor.

ADJUSTMENTS: Take plane to some wide open place for trial flights. Glide model into wind. If it stalls move wing back, if it dives move wing forward. The original had an additional 1/16" positive incidence under wing and 1/8" negative under elevator. After glide is flat and smooth, wind motor 100 to 200 turns and launch. If the model doesn't turn under power, add 1/32" to left of nose block. If it doesn't turn in the glide give it a slight turn by the rudder tab. In case it stalls under power add small piece of wood at top of nose block. However, very little down-thrust should be needed. Follow this procedure till it climbs and glides in about 75 to 100 ft. circles to the right. When completely satisfied with performance give it full winds. A motor of this size should take 900 to 1000 turns; however, plenty of leeway should be left. The original was not wound more than 900. And when you see her rising like an elevator and heading upstairs start running or jump in a car, for its cross country—two to one.

BILL OF MATERIALS

All measurements inches unless otherwise specified.

Body

12—1/8 sq. x 36 balsa (Longerons, hard; Cross braces, medium)
1—1/8 x 2 x 24 sheet fill-ins, etc.
1—sheet of celluloid—Windshield and Inspection panel.
1—Short length of 3/16 in. dowel (rear hook).

Wing

2—1/8 sq. x 24—leading edge
1—1/8 x 1/2 x 24—trailing edge.
1—1/16 x 2 x 36—Ribs
1—1/8 x 2 x 12—Wing tip and Gussets
10—1/16 sq. x 24 spars
2—1/8 x 3/16 x 24 main spar

Elevator

1—1/16 x 2 x 12—ribs
4—1/16 sq. x 24—spars
1—1/8 x 1/2 x 24—trailing edge
2—1/8 sq. x 24—leading edge and main spar

Rudder

1—1/8 x 2 x 24 sheet

Propeller

1—1-3/4 x 2-1/4 x 9—Prop block
1—block 5/8 x 1-3/8 x 1-5/8—nose block
1—block 3/8 x 3/4 x 1-1/2—Prop hub
1—10 in. length No. 40 music wire—counterbalance and hinge
1—1/32 x 1/4 x 3 sheet brass—Prop fittings
1—8 in. x 1/16 diam. music wire—Prop shaft
1—piece of lead counterbalance

Landing Gear

1—10 x 1/16 diam. music wire—landing gear
1—1/8 x 2 diam. hardwood wheel or balsa wheel
2—1/4 washers

Miscellaneous

75 feet 3/16" flat rubber
1—ball bearing washer
1—No. 8 wire spring
1—3/4" wood screw
1 piece of rubber tubing
1 piece of aluminum
1/4" thick block of pine
Thread, dope, glue and 3 sheets of Jap tissue

VICTORY

Air Ways

(Continued from page 29)

Robert C. Hinkle of 1610 W. Capitol St., Jackson, Miss., staggers us with a list of names of the Jackson Model Airplane Club members eligible for the Honor Roll. He says: "Every member of our club 18 years or over is in the armed services with the exception of 2 who are attending Parks Air College. Following is a complete list up to date:"

LeRoy Bain, A/C, Navy; Fred Bordeleon, A/C, Navy; Robert Cooper, Aeronautical Engineering, Parks Air College; Edward Campbell, Navy; Eugene Causey, Pilot, A.A.F.; Bobby DeKay, A/C, A.A.F.; Morgan Jones, A/C, C.P.T.; Vernon Lancaster, A/C, A.A.F.; Sidney McCluer, Marines; Mac McClellan, Army; Y. B. Olive, Navy; Bill Payne, Gunner, M.A.F.; Douglas Rose, Navy; Jack Sampson, Operations and Maintenance, Parks Air College; Walter Shotwell, A.A.F.; Charles Smith, A/C, Navy.

Our hats are off to this spirited club and to the fellows who are making a

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. . . writes a student flier from one of America's foremost flying schools. Words of praise for model building come to us through the mail every day of the week.

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Grumman Wildcat

New Bell Airacobra P-39

Curtiss Warhawk P-40

Flying instructors, too, have found their model building experience of great value—for model building teaches aerodynamics . . . the fundamentals of design and flight. You, too, will find that your modeling experience will stand you in good stead in the flying world of tomorrow.

PARACHUTE PLANE

. . . with Automatic Trap Door Release

WINGSPAN 40" — $1.50 — LENGTH 28"

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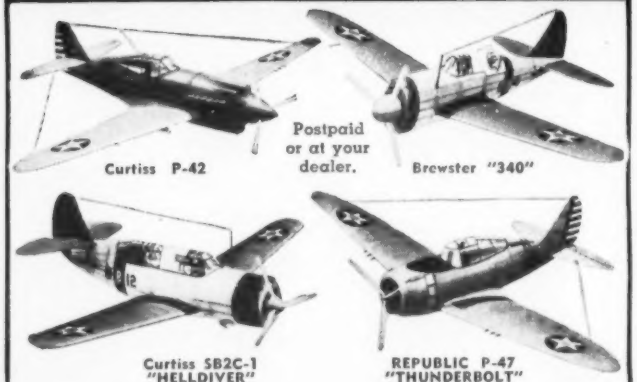

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NEW 30" MODELS ONLY 50c EACH

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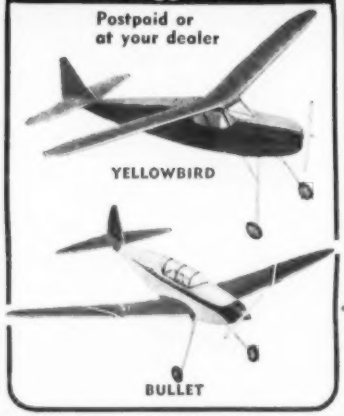

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name for it!

Another club which deserves special mention is the Linden Model Aircraft Club, Linden, N.J. Its members now in the armed forces are:

Pvt. Robert L. Lange, U. S. Marine Corps., Unit No. 725, c/o Postmaster, San Francisco, Calif.

Candidate Francis Ryan, Co. K, 3rd Regiment, Quartermaster School, Camp Lee, Va.

Air Cadet Adolph Pribush, 11th A.A.F., F.T.D., 43 F, Barracks 9, Tucson, Arizona.

Richard Egles, A.M. 1C, Navy 603, c/o Fleet P.O., San Francisco, Calif.

Corp. Harry Herman, 32207327, A. P. O. No. 257, Med. Det. 434th Armored Field Art. Btn., North Camp Polk, La.

Pilot Officer Al Shukis, No. 2, S.F.T.S., Uplands, Ottawa, Ontario, Canada.

Plt. Sgt. Ralph G. Mann, U. S. Marine Corps., Unit No. 850, c/o Postmaster, San Francisco, Calif.

Crp. Fred Wehrum, Battery C, 445th Separate Btn., Camp Davis, N.C.

Pvt. Roy Messinger, 32302624, Co. H, 2nd Btn., 175th Infantry, A. P. O. No. 29, c/o Postmaster, New York, N.Y.

Sgt. Joseph Sibilski, 12038595, 53rd Fighter Squadron (T.E.) A. P. O. No. 831, c/o Postmaster, New Orleans, La.

Vincent "Red" Mazza, Group No. 2, Squadron E-1, A.A.F.C.C., Nashville, Tenn.

Crp. Silveo Colletti, Medical Detachment, Station Hospital, Langley Field, Va.

Adolph Wiskosky, Squadron No. 3, Barracks No. 6, A.A.F.C.C., Nashville, Tenn.

Crp. Eugene Matrejek, 113th Inf., R.C.T., Freehold, N.J.

Victor Converso, c/o C.P.T.P., St. Boneventure College, St. Boneventure, N.Y.

New Enlistments

Pvt. Francis McElwee, Pvt. Fred Moshberger, Pvt. Elmer Granitzki, Pvt. Eddie Gross. All with 567th Technical Squadron, Atlantic City, N.J.

Other new Honor Roll members are:

Frank Ehling of Jersey City, N.J., now at Hobbs Field, N.M.; Alan Orthof of New York City (Alan is now making good use of his expert drafting knowledge and is Tech. Sgt. in charge of a drafting department); Bruno Marchi of the AMA now an Aviation Cadet at Yale University (Bruno served for several months in Alaska, so by this time he should be a hardened Doughboy); A/C Maurice T. Baer of Oswego, Kan.; A/C J. A. Schulze, 301st A.A.F.F.T.D., Corsicana Field, Corsicana, Texas; Lester Ritchie, Portland Air Base, Portland, Ore.; Pvt. John J. Funk, 788 T.S.S. Bks 886, Lincoln Air Base, Lincoln, Nebr. Another prominent model builder now studying for active armed service is Albert L. Lewis, former Academy of Model Aeronautics Director. Sal Taibi of Brooklyn, N.Y., is doing good work at Langley Field, Va., as are many others from whom we have not heard. Leon Shulman of Newark, N.J., has been in the Army for sometime and now expects to be called at any time as an Aviation Cadet; Earl Stahl of Johnstown, Pa., is now in service in Fla.; Sydney Struhl of Brooklyn expects a call at any time.

Everyone of these names demonstrates the importance of model designing, building and flying. However modelers on the home front are doing important work too: they are keeping up the good work that must be carried on in order to keep a steady flow of candidates for Army and industry, trained in aeronautics.

Many modelers have gained prominence as designers and builders of miniature planes, in many cases, to publicity as well as ability. Therefore many fans throughout the country have come to believe that experts are limited only to prominent builders. However this is far from the truth—some of the most expert builders in the country, those who have really done more for model building than many who have received publicity, are hardly ever heard of; or at least many of their ideas and contributions to the game are not attributed to them but often to those who are more self-asserting.

One of these comparatively "unknowns" is Frank Ehling. Frank has probably contributed as much if not more to the model game than any builder in the country. Unique ideas spring from his fertile brain at every "turn of the prop." Those who have flown with Frank at contests know how true this is, and, too, Frank usually places among the winners. He is noted for unique structural designs, unique not because of erratic design but because of structural simplicity and efficiency.

Picture 1 shows Frank with one of his latest models that he has found time to construct while in active service. Frank usually is so busy concentrating on new developments and improvements that he can find no time for publicizing his virtures, so we take pleasure here in doing this for him.

Picture 2 shows a very remarkable gas model gliding in for a landing. It is one of the few biplane scale models that gives efficient performance; a Curtiss Hawk P-6 of 6 ft. wingspan powered with an 0.6 hp. engine. Its creator is Edmund Tierney of 1329 North Shore, Chicago, Ill. This ship was built carefully to scale with only a few modifications; these consist of a slightly enlarged stabilizer, slightly longer fuselage and a little more dihedral. It takes off in about 50 ft. and climbs at a 16-degree angle; it has been flown about 35 times without any mishap. Tierney says: "The ship makes the most beautiful landings you ever saw, gliding in slowly and gently, as illustrated in the picture."

It is built very ruggedly with all stressed points made of plywood, yet it can be assembled or demantled at a moment's notice. Top wing is in one piece held to the centersection struts with heavy rubber bands. Lower wings pull out just outside the body and the outer struts fit into sockets in the wings and are held with light rubber bands. The whole tail assembly detaches in front of the elevator. These features make it very easy to transport. The model won first prize in an exhibition contest held at the Army War Show at Chicago last September 2nd to 12th, winning a $25 war bond, free ticket and blue ribbon.

A beautifully designed U-control racer is shown in picture 3, an R-1 built by

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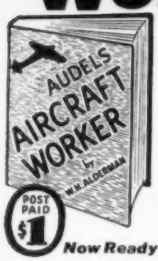

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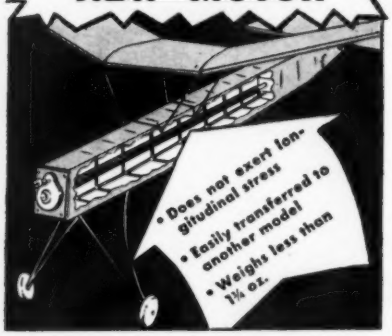

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13. A gas model converted into a fine sailplane.

George Herbert of Monongahela, Pa., R.D. 1. Its wingspan is 40″, length is 30″ and weight is 3-1/4 lb. when powered with a Tiger Aero engine. The fuselage is balsa plank, wing and tail covered with silk. The best speed developed so far is 57 mph. Mr. Herbert, who is 30 years old, married and has 3 children, comments further as follows:

"I am quite proud to say that I have been building model planes for the past 16 years and purchased my first copy of M.A.N. in 1932. I am sold on U-control models and have just finished my second racer, the R II. Last spring I took my old Cub and made the necessary alterations for tether flight. I also made a control stick as described in 'Controlled Lightning.' This stick, if you remember, had a plywood plate with a horizontal boom sticking out from it to which the control stick was pivoted. Your plans called for straps to fasten it to the operator's waist, but we discarded these and simply grasp the horizontal boom with the left hand, holding the plywood base against the stomach, and work the stick with the right hand.

"This seems more like real flying than the simple wrist movement handle that most U-control fans use. We tried both methods and favor the stick described.

"Well, the old Cub flew very nicely; it took off and landed just like a big plane, and I like to think of it as my primary trainer. I would recommend that anyone entering the U-control game should convert an old slow-flying model and learn to handle this ship, rather than take a 'hot' racing job and crack it up learning to fly. After all, the Army doesn't use pursuit ships as primary trainers.

"I built the R-I racer last summer and made a number of flights with it, during late summer and fall, without any serious accidents with the exception of its first flight which ended in disaster. The old Cub had been flown in counter-clockwise circles with the rudder offset to keep the wires taut; the motor torque didn't make any difference on this slow, large span plane. I tried to fly the R-I in the same direction but the torque caused a wicked vertical bank and the ship came in toward the center of the flight circle and headed for the ground at the same time. All I could do was watch, but I didn't have to watch long; it landed on one wing and took the wing off and broke the prop. (The wing and fuselage are made in one piece and the wing is not detachable, except by force.) After repairing the wing I changed the controls so that the plane would fly in a clockwise circle, and it performed perfectly for many flights. We use control lines 85′-4″ long which at 16 feet altitude gives a lap of 1/10 of a mile."

Lyle Rosendahl of Pinedale, Wyo., sends us picture 4 showing his neat little gas job built while he is attending Parks Air College. It uses a special airfoil designed by Leonard Reinhart. The fuselage construction is quite interesting, being composed of longitudinal stringers supported by circular bulkheads. This is quite a change from usual flat-sided gas model fuselages. This construction was evidently borrowed from scale rubber model design, and keeps weight at a minimum.

One of the finest gas models ever built was the Eastern States Champ, designed and built by Robert Simmons some years ago. Since then many builders have built and flown this ship; one of these is Jack Butler of 387 S. 5th W., Payson, Utah, who sends us picture 5 showing the unique structure of this plane. The wing is especially interesting: the single main spar is built up, embodying 2 cap-strips with intermediate vertical struts and diagonals. A very light trailing edge is possible because of diagonal bracing between the ribs, providing great strength. In the fuselage a rounded effect is provided by cementing longitudinal stringers on the outside of a rectangular framework. The depth of these stringers vary to provide the rounded contour.

Picture 6 shows an interesting U-control model of a Grumman Wildcat, with its builder. We regret that we are not able to give his name, but this information was not received with the picture. However the picture illustrates the realistic effect obtainable with this type of ship. The cowl is removed, engine and mount clearly visible. A retractable landing gear has been replaced with more practical construction for U-control flying.

Mr. V. J. G. Wilkerson of England started building models as a hobby but found that he could apply it in a very useful manner. Crashes and blazing aircraft must be shown in motion pictures of the R.A.F. Obviously it is nearly impossible to obtain desired "shots" of full size craft, so Mr. Wilkerson constructs carefully-detailed life-like models. He is shown holding two of them in picture 7. Now this important war job occupies all of his time and he has a complete factory in an old farmhouse where he employs 14 highly skilled craftsmen to construct the many models required. Some of these take many hours to complete inasmuch as every detail of structure and finish must

be carefully carried out to give the appearance of full scale ships. You can note the rib lines on the wings, exhaust pipes, carefully shaped propeller and engine on the model at the right.

Jack Ulstad of 610 N. Delaware, Mason City, Ia., sends picture 8 of his first gas model. It is a Baby Shark G-line model designed by Victor Stanzel. Power is supplied by a Brownie engine.

Leon Shulman is shown in picture 9 with one of his latest developments, a semi-Flying Wing U-control ship with the tail supported at the end of a single boom. You will note there is no fuselage, the motor being mounted in the wing with the cylinders horizontal. Cooling is provided by an air vent close to the leading edge. It hops off the ground quickly and inside of one lap picks up to 58 mph., yet it lands as slowly as a duration model. The .40 steel U-control wires are enclosed within the wing structure. It has a single landing gear and a timer that allows the motor to run at a set speed for regular flying. At a predetermined time the timer retards the engine spark and slows down the engine so it will land safely with low power.

W. Benz of 1775 Pandora St., Vancouver, B.C., Canada sends us his picture, 10, holding his recent creation—"Termite." This gas model was built out of plywood, spruce, with balsa used only "here and there." It flies very well. Regular model building materials are scarce but Canadians are able to find substitutes. Benz belongs to the Vancouver Gas Model Club which used to have over 200 members, most of whom now, however, are in the R.C.A.F. or in war work; those in war work get around only occasionally. Most of their flying is done on a farm on Lulu Island; the field, generously donated by the owner, Mr. Mitchel, is used once a month for contests. One of the recent contests was won by Dave Corliss of Victoria, Can., with an out-of-sight flight by his Class B job. The Vancouver Gas Model Club holds the Canadian record of 29 min. set by Bob Orr.

Edwin W. Daley of 433 W. 31 Street, Erie, Pa., has created a setting of seapower for his model airplanes. He is a solid scale model fan with 8 years experience. Though he has confined himself to solid models he has built a number of flying ships as well as built-up scale jobs.

To provide a realistic background for his planes he has also constructed a model Army and Navy, all built to 1/4" scale, ships included. This scale makes some of the aircraft carriers and other ships quite large but this is kept down by building cruisers and carriers of the small type. However one of his carriers weighs 40 lb. and is 6 ft. long, large enough to carry 15 planes on its flight and hangar decks.

Picture 11 shows one of Daley's smaller carriers with several models on its deck. Daley has a fleet of about 130 solid models of all types, being equally divided between Army and Navy. They are all decorated, indicating various combat groups, and include Wildcats, Airabonitas, Devastators, Corsairs, Avengers, Flying Fortresses, Hudsons, Mustangs, Lightnings, Airacobras. Some of the models are made from pine, others from balsa. Daley says he was a bit apprehensive about trying pine but now likes to work with it very much.

Picture 12 shows two of the finest "pigmy" models presented so far. The larger one is a Lockheed P-38 with a 5-1/2" span, the smaller, a Boulton Paul Defiant 3" span. The P-38 has every detail except landing gear and propeller; the little one is also carefully detailed. The 5c piece in front of the P-38 provides some idea of the size of the plane. They were built by David Finnegan of 4621 34th St., San Diego, Calif. Usually ships as small as these lack detail and are poorly finished, showing the grain of the wood; however, this is not the case with these little planes and Finnegan is to be commended on the precision of his workmanship.

Photos were taken with a candid camera with a 4" magnifying lens taped over the regular lens. It is a fairly good photograph considering the focal length. Finnegan wants to know how to prepare pictures so that they are suitable for publication. This is an easy matter provided certain amount of care is used when photographing your ship. This picture

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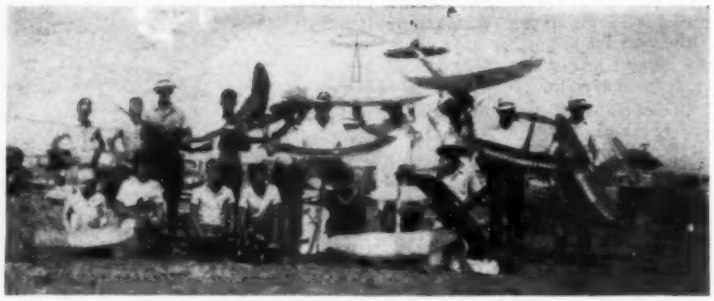

14. Members of the Lindsay Gas Model Club at a recent contest.

would have been very much clearer if the background had been a different tone from the planes themselves; white, for instance, or even black. The light was too concentrated and therefore caused intense shadows back of the ship, creating a confusing effect; 2 or 3 lights should be used, playing on the object from different directions. This brings out the detail without shadows. The lights can be arranged so that proper shading on the surfaces results. Many send pictures that cannot be used, so, remember, if you wish them published they must be up to a certain standard, otherwise they will not reproduce nor will they do justice to your handicraft.

Jack W. Miller of 2421 26 St., Lubbock, Texas, writes as follows:

"With the present shortage of motors it is only natural that model builders would turn to towline gliders. One of the easiest and most practical ways to produce a good glider is to convert a gas model into one. Picture No. 13 shows a cabin gas job that was converted to a glider. The nose from the firewall is forward and the landing gear shortened. Also a little rudder area was added to account for the added nose area. The above procedure is followed in the conversion of full size lightplanes into three-place training gliders. This model has 340 sq. in. and weighs 14 oz. giving it a 5.9 oz. wing loading. You can imagine how strong a glider with gas model construction would be. The model will average a minute on a 100 foot towline."

Contests

J. C. Slack of 361 Eastwood Ave., Lindsay, Calif., sends us picture 14 showing a group at the Lindsay Gas Model Club contest held recently. Arle Armstrong of Fresno "walked off" with high time of the day. Members of the Fresno Gas Model Assn. also competed with the Lindsay Club.

Comments

A long interesting letter from A. H. Baddeley, Prince Avenue, Montmorency, Vict., Australia has just reached us. He says that he just received the December 1942 issue of M.A.N., so evidently model builders "down under" are getting the latest "dope" from America. Baddeley writes:

"In the suburbs of Melbourne (capital of Victoria) before the war, the model aviation game was on the increase. Club memberships were increasing rapidly and the competition was fairly keen. There were several active clubs—the Victorian Model Power 'Plane Society (gas models), Melbourne Model Aero Club (of which I am a member), Elsternwick Districts Model Aero Club, West Preston Model Aero Club, Essendon Model Aero Club and others, the ones specifically named being the most important and having the largest number of members. As an example, at the start of the war the membership list of the Melbourne Club contained about 50 names. The larger contests, especially the Shaw Cub which is for open rubber driven machines (of all types), were so well patronized by fliers that it was found difficult to get through all of the flights in one afternoon (with 3 flights per flier and 3 sets of timers). All of the above mentioned clubs were combined or affiliated to form the Victorian Model Aeronautical Association which held a separate series of contests—one per month—in which members of the affiliated clubs could compete.

"When the war started the situation

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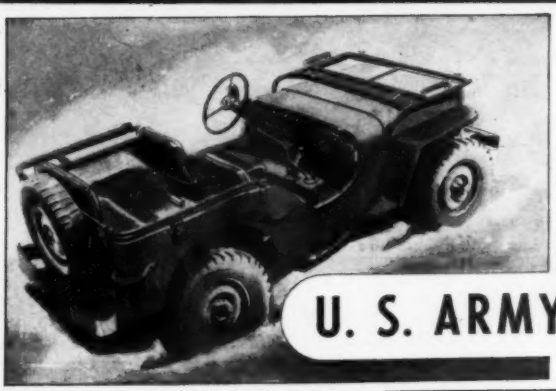

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Youth in Aviation (Program manual for leaders and Contests). **$2.50; Model Airplane Contests (Official rules, etc.) $1.25; How to Get A Job in Aviation,** 96 pgs. By C. F. Matoon (Curtiss-Wright) **25c.**

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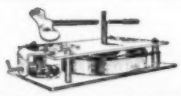

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Exceptional power for boats from this strong, spring motor. Easily wound. Complete with winding crank. Though they show the signs of storage and disuse, we guarantee each to be NEW & UNUSED! Cleansing and oil application will do wonders! Only a limited quantity.

DYNA FLASH COIL

For all A, B or C motors. Quick start, low drain, lightweight (1⅞ ozs.). Unconditionally guaranteed **$1.75**

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Let Cobwebs Accumulate on Unused Motors

Keep 'em Flying!

Trade or Sell!

If defense work or war activity prevents your building—flying, put your motor back into use by loaning, donating OR SELLING your equipment! If no ready market near you, we'll be pleased to handle purchase or trade of such items. WE PAY in CASH, WAR STAMPS or BONDS or CREDIT CERTIFICATES, whichever you specify! Bring or mail engine regardless of age or condition for prompt appraisal allowance! Insure for safety!

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"Soak 'em, Slide 'em, Stick 'em"

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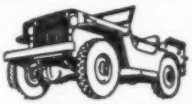

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The war "limousine" used by The President at Casablanca! Scale model kits in heavyweight pulpboard 29c; Wood kits 50c; Giant size $1.25. Detailed plans and turned wheels in each! (BY MAIL, add 15c for packing-postage.)

CONDOR GLIDER $1.00

Advanced soarer, 7 ft. Class "E," 324 sq. in. wing area. For towline or hand launching.

EAGLET GLIDER 50c

4 ft. pod shape fuselage, unusual tail boom. Class "D" Towline or Hand Launch.
Add 15c for postage & packing for all gliders.

SKYWAY All-Metal KNIFE FREE!

STINSON RELIANT 30" 65c

Popular model, detailed plans with turned nose, all balsa. Kit alone valued at 69c. Skyway Knife with Double-edge blade included. Special, only POSTPAID **65c**

GIANT SCALE SOLIDS

16" wingspan. Twin props cut to outline shape • fuselage, wings, insignia, liquids, as full size, simplified plans. **$1.00**

Also in These Models:

LOCKHEED "P-38" LIGHTNING—13" span
(Cut to outline nacelles included)
MESSERSCHMITT ME-110—14" span
DOUGLAS "B-19" BOMBER—19" span

Complete kits for speedy assembly of beautiful models. Cut to outline shape fuselage and wings; turned wheels, insignias, liquids and full size plans. (By mail: Add 20c per kit.)

CLEVELAND KITS

LOCKHEED HUDSON $7.50

Limited space prevents listing of ALL kits obtainable here! We regularly carry: Berkeley, Cleveland, Comet, Burkard, Bay Ridge, Ideal, Megow, Master Modelcraft, Guild, Scientific, Joe Ott, C-Z! It's convenient to centralize your purchases!

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JUST RELEASED!

Capitol's

"Distinguished Design"

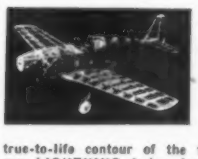
LIGHTNING "P-38"

30" WING SPAN RUBBER-POWER

The "extra something" which distinguishes this famous, quality line of model aircraft has been incorporated **IN FULL MEASURE** in this brand new version of **LOCKHEED'S "Lightning". It's built as no other model! Unsparing use of "stringer-ribs" moulds and shapes the model to precise duplication of the big fellow! "Blisters", Nacelles, Twin Rudders—every detail reproduced! Tested rubber-power fliers! It's a prize-winning project!**

65¢ by mail add 15c

Illustrated Full Size Plans



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The exclusive building feature in Capitol Aircraft—which trebles the strength and assures true-to-life contour of the finished model. In this new LIGHTNING design, ingenious notched-lock construction permits easy removal of nacelles, and hair-line fit when installed!

EACH KIT IS COMPLETE! Covering tissue, specified insignias, lettering, and detail "step-by-step" 3 VIEW plans with lots of photos of the actual LOCKHEED P-38 to help you finish the job!

6 STANDARD 30" WAR PLANES 65¢ EA.

Supermarine SPITFIRE
CURTISS WARHAWK
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DOUGLAS DEVASTATOR
(27" wingspan)
GRUMMAN WILDCAT
NORTH AMERICAN MUSTANG

Capitol 40" to 50" RUBBER FLIERS

CRYSTAL-CLEAR PHOTOGRAPHIC FULL SIZE PLANS

$1.25 For mail service on any 65c model, add 15c; add 20c for Larger, $1.25 kits. All kits are complete except for rubber!

Giant size rubber-fliers with all the deluxe construction features which made CAPITOL Models "tops" with foremost builders from coast-to-coast! Most folks build two of each: 1 to fly—AND WIN! The 2nd is jealously preserved as a solid—for home, office, den or club! Ready: NORTH AMERICAN APACHE; Supermarine SPITFIRE; CURTISS P-40!

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ENTIRE 2nd & 3rd FLOOR Between 33rd and 34th Streets, Diagonally opposite Penn and Long Island R.R. Station.

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NEW ITEM!

You asked for it—you're going to get it—soon. It will be a volume item.

In the meantime, we're all set at our new plant to give the finest possible service on the thousands of Rogers Motors now in operation.

Keep 'Em Flying!
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8 SCALE MODELS Shaped Bodies included **25c EA.**

Here's new buying power for "two bits!" Die cut tail assemblies and propeller. Choice of CURTISS P-40, DEFIANT, HELL-DIVER, SPITFIRE, SPAD, STUKA, MESSERSCHMITT 109, FIAT FIGHTER! 3 view plans speed construction. Be sure to specify the model kit desired.

JEEP Super detail, 1½" scale. Movable wheels (5) windshield, incl. transparency. Leatherette type seat covering. Detailed plans. **29c**

Super Detail Giants $1

Best-known, best looking GIANT $1 kits today! LOCKHEED P-38 (13"), MESSERSCHMITT 110 (14") GRUMMAN SKY-ROCKET (16") DOUGLAS B-19 BOMBER (19") Kit is complete!

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Shaped bodies & wings, liquids, printed cockpit transparency. Choice: GRUMMAN WILDCAT, JAP ZERO, RUSSIAN STORMOVIK, MUSTANG, HEINKEL FIGHTER, VULTEE VANGUARD, LOCKHEED P-38, SPITFIRE, CURTISS P-40, VOUGHT SIKORSKY, BOULTON PAUL DEFIANT, SKYROCKET, REPUBLIC THUNDERBOLT, AIRCOBRA

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Mail orders **MUST** be accompanied by postage! 20c for $1 kits, 10c each for others. Sorry! No C.O.D.s.

Power Mist — Spitfire
Proven Superior Racing Fuels

NEW—
Power Mist Aero blended fuels with castor oil lubricant, for plastic tanks.
11 engines favor No. 1 blend, qt. container....75c
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5 Methanol base fuels—Compounded for various atmospheres, compression ratios and timing.

Prices 10c higher East of Rockies.
Full information and fuel facts.
Please enclose addressed stamped envelope.

FRANCISCO LABORATORIES
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NEW REDESIGNED MODEL OF *Dick Korda's* **WORLD RECORD HOLDER**

WINNER OF MORE CONTESTS THAN ANY MODEL IN THE WORLD!! SIMPLE AS ABC TO BUILD AND FLY!!

A time-tested champion! Proven in actual competition the world's best flying model. Winner of contests everywhere—even when made by beginners.

New Features include polyhedral wing, finished all steel landing gear, instructions for one-bladed fold-back prop and numerous other modern refinements.

43" WINGSPAN 69¢
Add 15c by mail

Manufactured Exclusively by

OVRD MODEL AIRPLANE CO.
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NEW CATALOG 10c
Over 100 multi-colored action drawings of modern battle and sport planes.

JOBBERS: Get this profit making line in all price classes—10c, 25c, 50c and $1.00. We are making prompt deliveries.

was changed completely. As a defense measure, the Prime Minister of Australia, Mr. Curtin, requested that no petrol driven model aircraft ('gas models' to you) should be flown during the war, especially near the coast or near aerodromes ('landing fields'). This caused the suspension of organized flying by the Victorian Model Power 'Plane Society.

"Many builders seem to have found it comparatively easy to obtain motors but batteries and balsa and landing wheels are more precious than gold and, to make matters worse, clothes rationing coupons are required by stores which sell silk covering material for the ships. It is hard enough to get along on the coupons if one buys only clothes without using them upon silk.

"Another set of builders are turning to sailplanes (this applies to the few remaining active members of my own club). I have been trying to get around the shortage of material by using smaller machines, built-up ribs, single surface wings, etc. We try to employ all of the balsa which we can get in the development of new designs. A couple of us are experimenting with canard sailplanes.

"The number of members who still attend contests is very small. Some of the lads are in the military forces, others are working in aircraft factories and do not have much time to spare. As for myself, I am a student at the University of Melbourne (I am doing an engineering course). At the moment the University summer vacation is in progress. However this, too, has been altered by the war."

We are sure Mr. Baddeley would welcome letters from American model builders telling him of activities here.

California

Leta and David McAllister of 236 Garrett St., Chula Vista, Cal., seem to be "blue" about inactivity due to the war. They should take heart; even though there may be a temporary lull while the boys are licking Hitler and Hirohito, their comeback after the fracas will be stronger than ever. Everybody is looking forward to super-intensified model airplane activities now that the schools have taken this hobby up in a serious manner and are "spreading the news" among the younger and up-coming generation. The McAllisters write:

"Due to the war claiming so many of our model fliers we hear reports that this club and that club is going 'to the dogs'. The San Diego Aeroneer's have lost many of its fliers, which does make its members somewhat downhearted; but our meets are regular and most of the fellows get out to do their flying for ribbons, cash and trophies. Many are unable to get out to our meetings and meets, but so that those fellows may know what is going on in our club, and in other clubs, our lady flier has presented us with a monthly newspaper called the 'S. D. Aeroneer's Gas Model Bulletin'. The copies are not large, being only one or two pages of typed material, but it contains news of all the California model clubs, whom the Editor keeps in touch with, as well as news from the big model magazines, and lastly—report on our own meets and meetings as well as a pun or two. Results of our January meet were:

C Class: Mrs. Flying Mac (Leta McAllister), Denny Davis, Gene Ryan (Pres.), Eddie Hume, Gene Ryan. A-B Class: Clifford McBane, Denny Davis, Don Lutes (Sec.).

Following is a report of the recent monthly (January) contest held by the Fresno Gas Model Association.

The first contest for 1943 got off to a good start; the weather was perfect for flying and we had a good number of entries.

Class B ships had a full day in taking all the high honors. For ten minute flights of the day in Class B: Bill Dunham, two; Red James, Ocie Randall, Joe Menezes, one each. Class C: J. C. Slack, one. Class A: Roy Gruenwald, one.

Some of these high flights were clocked for their entire duration and totals recorded: Bill Dunham, with the high total of three flights, 64 min. 15 sec., and Ocie Randall with 54 min. 42 sec. The other flights were not recorded.

There were a number of new ships out for the new year and we think we will have a lot of competition for the coming year. Other results:

Class A	Time
Roy Gruenwald	1000 Sec.
Joe Menezes	750 "
John Marshall	444 "
Ocie Randall	365 "
Jack Whitling	298 "

Class B	
Ocie Randall	1542 Sec.
Bill Dunham	1485 "
Joe Menezes	1062 "
Red James	902 "
Jack Edmondson	563 "

Class C	
Dutch Van Tassel	1172 Sec.
John Marshall	932 "
Paul Nieto	809 "
J. C. Slack	697 "
Red James	598 "

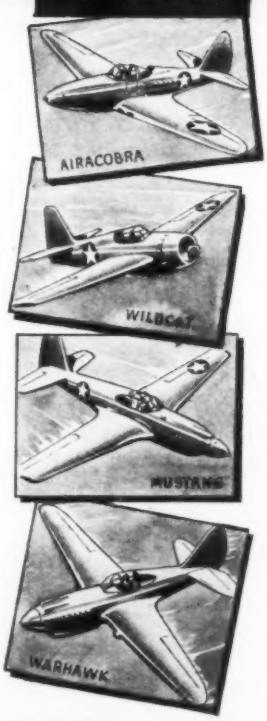
Jr. Results	
Paul Nieto	809 Sec.
J. C. Slack	697 "
Ted Winter	475 "
Bud Warner	303 "
Charles Sheetz	235 "
Albert Flint	174 "

JIM WALKER ANNOUNCES

Whip-Power U-Control

A New Motorless Plane that You Control in Flight

Whip-Power U-Control is made in all these famous models



Climbs, Dives, Banks and Loops

JIM WALKER'S research at American Junior Aircraft has developed a new star performer!

It is the amazing new Whip-Power U-Control. A fishing rod, bamboo pole or other long stick takes the place of a motor. And what speed! Whip-Power planes have been clocked at 98 m.p.h.

Flight is controlled from the ground. In instant response to the control stick the plane does a whole bag of tricks—climbs, dives, banks, loops, chandelles, wing-overs, changes speed.

Whip-Power planes fly on control strings up to 40 feet in length. They can be flown in any kind of weather, and right in your own yard or in the street.

Whip-Power planes are profile scale models of famous fighters that thrill us every day with their heroic exploits. The Airacobra model is now in production. Other models will follow soon.

Your Whip-Power plane is a sturdy craft, made of non-critical balsa wood, with a wing spread of 19 inches. It comes to you in a kit with all parts cut to size. All you need is a knife, sandpaper, cement, dope and thread for the controls.

American Junior Aircraft is producing these planes as fast as possible after filling orders for planes for the armed forces. They will be ready for shipment on April 15. Possibly your dealer will not have enough Whip-Power planes to fill your order immediately, but your patience will be rewarded amply by the fun you will have when you try out your own ideas of aerial gymnastics.

New U-Control Model to be Announced

Still another Jim Walker model made of non-critical balsa and flown by U-Control is nearing completion. This plane, the Firecat, will be announced in the near future.

AMERICAN JUNIOR AIRCRAFT CO., Jim Walker, President, PORTLAND, OREGON

de luxe GIANT Solids

CHOICE OF 16 MODERN FIGHTERS BOMBERS

WINGSPAN TO 22½"

MOST MODELS $1.50

Detailed list in last month's ad, or in catalog.

FULL SIZE PLANS IN KITS

These kits (formerly known as BURK-ARD) are stocked by all dealers. If none near you send check or money, plus postage, for immediate delivery. No C.O.D.'s.

CURTISS P-40
Wingspan 20"

NORTH AMERICAN
Wingspan 20½"

SPITFIRE
Wingspan 18½"

BREWSTER-BERMUDA
Wingspan 17"

Available in popular "STANDARD" or "DELUXE" kits—either type can be speedily converted into MOVEABLE CONTROL models by hinging rudder and "stabs" at hinge lines!

"Lifetime" MODELS WITH FULLY CARVED FUSELAGE

Saves 4 to 6 hours carving! SANDING ONLY NEEDED!

Each kit contains cut-to-outline shape fuselage, wings (tapered trailing and leading edges where necessary!) nacelles, stabs and rudder; Material to make propeller, wheel pants where required. Turned wheels, Insignia, Cement, Base Paint, Celluloid for cockpit enclosure. Aluminum cowls where specified on plans. DELUXE KITS contain FULLY CARVED-TO-SHAPE FUSELAGE in place of cut-to-outline fuselage. Kits are identical in all other respects! $2.50 Most Models

These are super-detailed in every respect! In most cases (where governmental regulations did not conflict!) the models and working plans were scaled down from ORIGINAL PLANS! Standard or DeLuxe makes up a beautiful, faithful replica of the original!

FULLY CARVED FUSELAGE in DELUXE KITS only!

BAY RIDGE GAS MODELS

National "C" Champ PACER

Winner last Nationals "C" event with total time 24 mins., 42 sec. Built in adjustments. Sharp right turn under power, slow left circle in glide. 60" span, 45" length $4.95 PACER "B" 53" span, 37½" length. $3.95

STRATO-SPEAR. Jackson's "A" "B" Gas flier. Planked fuselage, formed landing gear, cut firewall, removable pylon. $2.95.

MIKE "A" 48". First small ship in gas model history (originally $4.95) $1.49. DIAMOND DEMON 44" span $1.49. TOPPER "A" Skyscraper wings. $3.50.

BANTAM REPLACEMENT PARTS
Exclusive, authorized distributor for available parts. Write your needs.

ACCESSORY KIT $1.00
Foil paper, brush, cement, insignias, colors, sandpaper and stylus for rivet detail incl. instructions.

36 pg. ILLUSTRATED CATALOG
36 pg. illustrated booklet, 5c. (Free with each kit) NOTE: Mail orders must include postage for delivery! NO C.O.D.

CONSOLIDATED Model Eng. Co.

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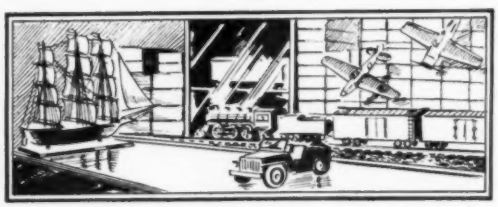
MANDEL'S



Chicago's Hobby Center

Probably the best known 6th floor in all Chicago—in the opinion of many mid-west modellers—is the one right here at Mandel's.

It houses the Hobby Center which, in turn, houses all the necessary and accessory items for completing model planes, trains and ship model projects.

As this was written, a shelf inventory reveals kits from Berkeley, Capitol, Cleveland, Megow, Ideal, Joe Ott, and all the other leading manufacturers.

Is it any wonder our 6th floor HOBBY Center is so popular? Take a tip, make the trip to—

6th FLOOR

Mandel Brothers

The F.G.M.A. also will have a series of rubber powered contests for the coming year. The first was held on Jan. 17th. Due to the short notice entries were small. High winds kept the flights very short. The next contest was held on Feb. 4th and the 2nd Sunday of each month thereafter. Results of the Jan. 17th meet were: (All times are in seconds).

Fuselage Event: Tex Marbut, 330; Bill Winter, 296-1/2; Ted Winter, 196; Red James, 135; Bill Dunham, 85. Hand Launched Gliders: Bud Warner, 88; Don Star, 85; Dorey Heaslet, 57; Charles Garabedian, 53; Russell Bayse, 49-1/2. Tow Line Gliders: Ted Dice, 120; Paul Nieto, 78. Stick Event: Bud Warner 502.

Michigan

Mr. R. L. Painter of 1115 S. University, Ann Arbor is leader of the Ann Arbor Model Flying Club. He writes of recent activities:

"The Ann Arbor Model Flying Club, formerly the Ann Arbor Gas Goons, had their first all U-Control contest, an indoor meet at the Yost Field House on March 21st.

"The club has gone a long way in the last ten months; when I became interested in the club we had six members, now we have 35. The Ann Arbor J.C.C. has been quite active in getting things done for us as they are our sponsors. We have a club room which is being fixed up for a workshop also. The club has a contest at least once a month for its members. They have a supply of kits, etc., on hand which are used for prizes for these monthly meets. A club paper, 'The Flier,' is going to be printed once a month. A model flying field has been given to the boys by one of the city's banks. Of course if the land is sold at any time the club will have to find another model airport.

"The C.A.P. Unit here wanted to start a C.A.P. Cadet Unit, so the model club was called upon to help them. The fellows that were old enough enlisted and then helped enlarge the group until we have a membership of fifty. I believe that we are the first club in the state to help start a C.A.P. Cadet Unit. We do not intend to stop building and flying models because of the war."

Notices

Billy Ehrlich, 2513 N. Sawyer Ave., Chicago, is interested in joining a gas model club and he would like to have any clubs in his vicinity who will accept another member get in touch with him. Ehrlich is especially interested in U-control and endurance gas jobs.

Bill O'Dell, 711 Poplar St., Waukegan, Ill., an expert modeler, would like to correspond with other builders, preferably gas modelers.

Charles E. Perkins, 635 Washington St., Gloucester, Mass., would like to form a model club in his locality. If anyone else in the vicinity is interested we suggest they get in touch with Mr. Perkins and "get the ball rolling."

VICTORY

Send in your comments and pictures of your planes to let the boys in service see what you are doing.

Frontiers

(Continued from page 15)

able weight and if this enclosed a coil of wire the weight would be tremendous. Consequently the picture arouses our curiosity concerning the nature of the ring and the principle employed. Possibly by some new method a magnetic field is created with a hollow ring.

There has been considerable pioneering both in the fields of freight planes and wood-plastic construction. The Curtiss-Wright Co. has seen fit to combine these two innovations, resulting in America's first military plane, the Caravan, built specifically for carrying freight. It is shown in the third and fourth pictures from the top, page 12, with a wide roomy body for carrying bulk loads and a thick sturdy wing for weight-lifting and strength. The value of this great design lies chiefly in the simple low-cost construction. Expensive complicated fuselage curves have been largely eliminated, comparatively flat sides being evident. A fleet of these large ships are now under construction.

In looking at the top left-hand picture on page 13 the reader might be amused by what appears to be a "freak" gadget without practical value. It is a double propeller mounted on a twin engine bomber. Simplicity is usually the watchword for all airplane designs; why, then, is this complication necessary? The answer is: it would not exist unless it was advantageous. There are two reasons for this unique device: first, with two propellers each may be smaller than if one were employed in diameter. This gives more ground clearance and makes damage less likely. The greatest advantage however lies in the fact that these two props turn in opposite directions and thereby eliminate propeller torque, one balancing the torque of the other. When all propellers turn in one direction there is an opposite force reacting on the plane to turn the plane over in flight, making it bank to the left. Common propellers turn to the right. To overcome this torque all airplanes must fly slightly sideways or have a greater angle of attack on the left wing, or both. This absorbs power and reduces speed. With counter-rotating propellers torque is balanced and the plane flies straight through the air with minimum resistance, resulting in considerable speed increase as well as simplifying flight control.

First major event on 1943's aviation calendar was the takeoff of Lockheed's big, fast Constellation transport, the four-engine culmination of Lockheed's engineering research in one airplane. It is shown in the top right picture, page 13. Faster than a Jap Zero fighter or any four-engine bomber now in active service, the Constellation will cross the continent non-stop in less than nine hours, fly to Honolulu in twelve. Wearing a wartime garb of Army camouflage the Constellation, designed originally by Lockheed engineers for TWA, is the largest, fastest and most powerful land-based cargo or transport plane. It can carry 55 passengers and a crew of 9 nonstop from Los Angeles to New York in record time.

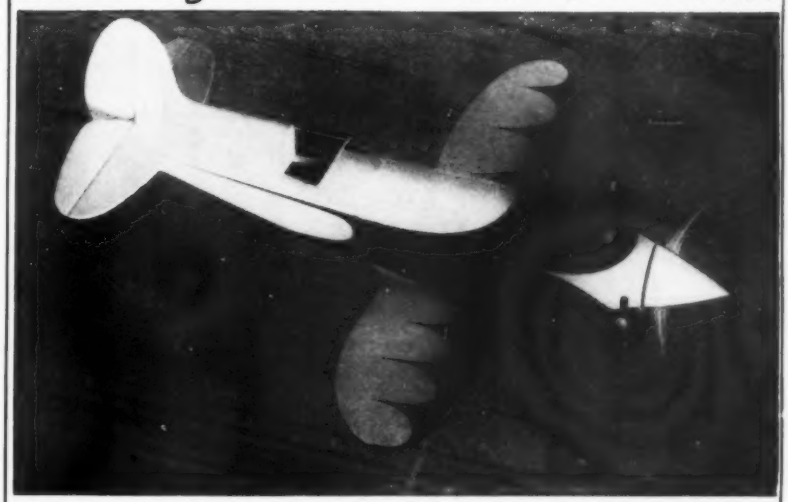
SUPER "G" LINE FLYING

ENTIRELY NEW & DIFFERENT

PATENTED

Stunts Galore — Super Speed — Full Control

Announcing The SUPER "G" SHARK



IT'S HERE, A Sensational New Directional Control System, SUPER "G" LINE FLYING and a Sensational New Elevator Type Control Model, The SUPER "G" SHARK, illustrated above. Especially designed for Super Speed and Stunt Flying, this Mighty Shark roars through space at speeds of over 100 M.P.H. Yet, so simple in construction and operation that even the beginner will experience no trouble. May be powered with any class "C" motor, such as the Ohlsson "60's," the Tiger Aero, the Super Cyclone, etc.

The New Super "G" Shark Construction Kit is a Prize-Winner. Contains plenty of fine quality, carefully sawn Wood, Hardwood, Plywood, Printed Parts, Cement, Dope, Covering Paper, Spring Wire, Streamlined Wheels, Super "G" Line Control Parts, etc. Together with a large fully detailed plan and instructions for building and flying.

COMPLETE $3.95 KIT

POSTAGE 30c

REGULAR "G" LINE & FREE-FLIGHT MODELS

BABY SHARK SUPER SPEEDSTER

COMPLETE $1.98 KIT Postage 20c

The new BABY SHARK, Super Streamlined Speed Ship, is designed for all Class A and B motors. This snappy little job flies at tremendous speeds of from 50 to 75 M.P.H.

TIGER SHARK SPEED DEMON

DELUXE $4.95 KIT Postage 30c

The TIGER SHARK, Super Speed Demon, is designed for all ½ H.P. motors. It roars through the air at unbelievable speed of from 60 to 90 M.P.H.

INTERCEPTORS UP

Fly the Sensational New INTERCEPTOR, Super Performance Class B Free-flight model. Tremendous climbing qualities. Kit unusually complete. $2.98 Postage 30c

SHARK P-60 "G" LINE MODELS

New Rubber Power and Gas Power Kits

Build and Fly one of these thrilling new ARMY TYPE PURSUIT "G" Line Speed Ships. All Kits are unusually complete throughout.

Complete Shark P-60 Kits

Rubber Power Kit Complete $1.95 POSTAGE 20c

For All Class C ½ H.P. Motors $2.98 POSTAGE 30c

DESCRIPTIVE FOLDERS, 5c

VICTOR STANZEL & CO., Dept. M., SCHULENBURG, TEXAS

BOEING B-17 FLYING FORTRESS BOMBER

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In the picture 2nd from top you see troops springing from a 9-place glider which has landed behind "enemy lines" during maneuvers. The glider was towed over its objective by plane and the tow cable released. Troops landed in this manner carry rifles, sub-machine guns, hand grenades and dynamite to destroy enemy communications. The armed forces has considered glider training important and many are speculating how hundreds of gliders are going to be used for invasion.

Of course these troops must be trained so large fleets of training gliders are now winging their way across countrysides in various parts of the U.S. In the 3rd picture from the top you see Aeronca gliders which have just come off the assembly line. They appear quite similar to the standard power driven Aeronca lightplane; in fact these gliders are remodeled power planes. Wing, tail and rear of the fuselage are similar to the powered ship; the nose and motor has been cut away and replaced by a longer nose, which is the pilot compartment. The landing gear has been shortened considerably because of the elimination of a propeller which demands ground clearance.

In the 4th picture you see a line of Grumman Wildcats standing with folded wings beside the runway. These are shipboard fighters and wings must be folded because aboard the big flat-top carriers space is limited. These are the ships that have given the Japs more than they bargained for in the South Seas. The method of folding the wing is quite baffling and very unique. Wings can be spread and ready for flight in a few moments.

Apparently gliders are not restricted to land, for in the bottom picture, page 13, you see the first seaplane glider, resting gracefully on the Delaware River like an immense seagull. The fact that hydro gliders are now being built stimulates our imagination and we wonder in what unique form of attack these will participate.

VICTORY

Sky Scouts

(Continued from page 21)

shock.

These conditions are characteristic only of an observation or liaison plane, which must fly steadily and land in all sorts of restricted places. It is the Fieseler Fi 156K "Storch", noted for its slow flying qualities and used by the Germans for frontline observation and liaison.

When observing silhouette 13C it is obvious that this is a heavy weight-carrying plane, as four motors are evident. It has a comparatively long slim body with long sharply tapered wings. This immediately indicates a bomber or transport. However observation discloses a slight bump on the top of the fuselage, indicating a gun turret and a greenhouse and observation place in the nose, both above and below. This exists for only one purpose: to house guns and an observer for bombing. So the ship evidently is a bomber.

Whether it is enemy or friendly is important, so your sense of observation must be strained a little further. You look at the wings and see if you can recognize their shape as indicating any particular airplane. If this doesn't tell the story observe the fin and stabilizer and general body shape. The fin is much smaller and the fuselage longer than American types, a characteristic common to German airplanes. However this isn't a German plane though it possesses a number of such features. In such cases you must revert to your list of pictures of enemy craft. If you are keen you will diagnose this as an Italian Piaggio P 108B four motor heavy bomber.

Don't confine yourself to the silhouettes given here—try this procedure with others you probably have in your files or scrapbook. Spotting units will find it interesting at meetings to place a group of silhouettes in view of all the members and to have each member write down the names of the various ships within a certain limited time. This is an excellent way to rate your ability and test your efficiency.

(NOTE) Albert Greenberg of 625 Lamont St. N.W., Washington, D.C. is in charge of a unit of aircraft modelers. He says that they meet for discussions every Friday night at 7 P.M. at the Boys Club, Mass. Ave. & 17th St. S.E. The group has the use of the craft shop every Tuesday and Thursday. If any spotters or Sky Scouts in the area are interested in joining this group Mr. Greenberg will welcome them. PLANE 13A—The Macchi C202 low single wing seat fighter. This craft is one of the latest Italian fighters and undoubtedly developed extensively under Nazi guidance. The ship is powered with one 1,150 h.p. Mercedes-Benz DB 601N engine installation of which follows German practice. It is of full cantilever design, clean lines, with only the radiator protruding beneath the wing aft of the retractable landing gear. The C202 has a wingspan of 34 ft. 8 in., is 29 ft. 6 in. in length. Maximum speed is estimated at 335 mph at 22,000 ft.

PLANE 13B—The Fieseler Fi 156K "Storch." This ship is of German design and has been in use on all fronts, including Africa and Russia, as an Army cooperation and liaison craft. Power is one 240 hp. Argus As. 10C inverted engine. The craft is lightly armed and easily recognized.

PLANE 13C—The Piaggio P 108B four-motor heavy Italian bomber, also bearing marked German influence in its design. Powered with four 1,000 h.p. Piaggio P. XII RC 35 engines, it is exceptionally clean in form. The P 108B is more formidable in armament then the average Italian bomber

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VICTORY

Modeling Your Future in Aviation

(Continued from page 11)

until a flat smooth surface extends between edges AO and B1 O1 as shown in Fig. 92. After surface OA B1 O1 is cut smooth carve out surface OD C1 O1 in similar manner. When cutting wood away from the outer half of the blade, cut towards the tip. Shave down the inner half by cutting toward the hub. This will avoid splitting the wood and cutting into the blade face, often caused by the direction of the grain.

After the two concave faces are trimmed down neatly, sand the surfaces smooth with medium grade sandpaper hollowing them to form a slightly concave surface, then finish them smooth with fine sandpaper.

Now you are ready to cut the forward or convex faces. The finished blades should have a cross section similar to that of a wing with the highest camber or thickest part about one third of the blade width from the leading edge B1 C1.

Cut away the wood in similar manner to the concave face but be careful not to make the blade too thin. Remember you can always cut away wood but cannot put it back again. Near the tip the blade should be quite thin, about 3/32". Close to the hub it should be thicker, about 3/16", to give strength, tapering in thickness from hub to tip.

When one is finished cut the second blade so it conforms exactly to the first. Do not cut away all the required wood from the first blade before carving the second in case you find it necessary later to cut away more of the first to match the second. When both blades are alike finish them down to the right thickness with medium sand paper and finish smooth with fine. The propeller will then appear like Fig. 93, with square tips. However these must be rounded, so cut out a pattern conforming to the blade pattern on the plans and place it on the concave face OA B1 O1, with the straight end at the hub center and the curved tip touching edge AB1. Then draw a line around the pattern on the blade face, indicated in Fig. 93 by the broken line. Mark the second blade in similar manner and cut away the corners up to the curved tip lines. The blades then will appear as in Fig. 94.

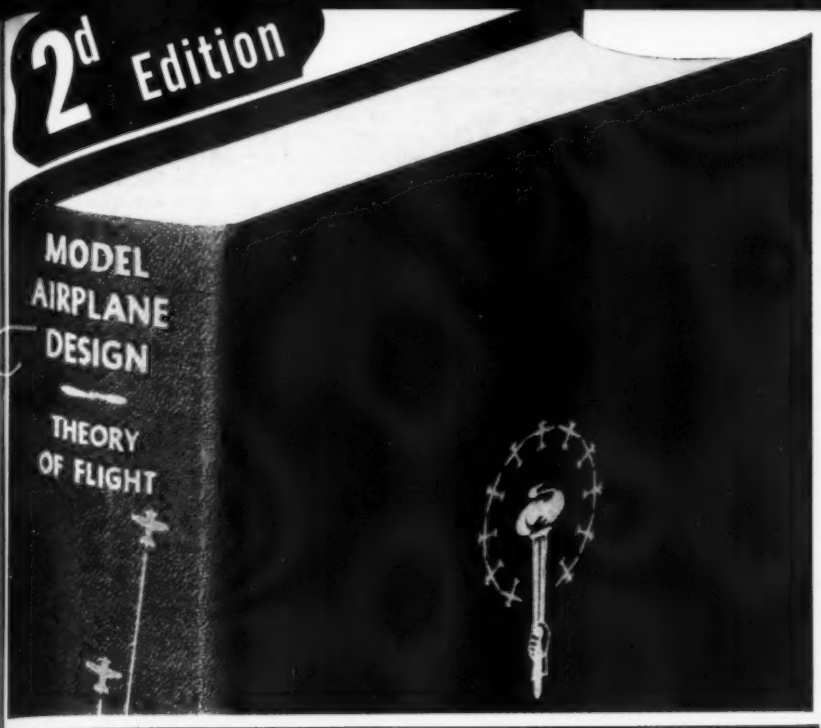
Now shave down the convex side of the blades at their tips so their thickness tapers to a smooth rounded edge. Finish with sand paper.

Only one more operation is needed now to finish the propeller: it must be balanced so it will spin true without vibration in flight. Drill a 1/32" hole straight through the propeller hub at O. This may be made with a pin if the propeller is made of balsa. If it is hard wood use a small drill. Then suspend the propeller on a pin or shaft through the hole: place it in a horizontal position. If it remains without turning it is properly balanced. But if one blade drops, that blade is too heavy and must be sanded down slightly to reduce its weight. Then balance the propeller again horizontally. Proceed to sand lightly and test for balance until it remains in any position in which it is placed without turning.

The first attempt to carve a propeller is seldom successful, but do not let this discourage you: try three or four and you will be surprised how quickly your technique and the resulting products improve.

When you have completed a propeller to your satisfaction start to construct the plane. First make the parts for the fuselage assembly according to the full size working drawings. These include: frame stick, stabilizer, fin, wing mount blocks, rear motor hook, propeller shaft and landing gear with wheels. The propeller bearing can be made from an annealed piece of corset steel or can be purchased at any model supply house.

If the plane is made of balsa simply cut out the stabilizer and fin from 3/64" sheet to the prescribed outline. If made of hard wood cut from 1/32" bass wood and also cut lightening holes indicated on the drawing. Both fin and stabilizer then are covered by cementing tissue paper to



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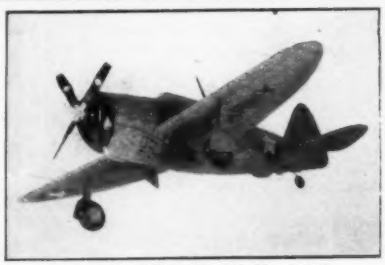

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both sides.

Assemble the parts when complete. The stabilizer is cemented to the underside of the frame stick at the rear, the fin to the right side of the stick directly over the stabilizer. Hold them in place with pins while the cement is drying. The rear motor hook is slipped over the rear of the stick and stabilizer and cemented in place.

Next cover one inch of the front end of the stick with cement, then bind the bearing and landing gear in place with thread, see assembly drawing. The wing mount blocks are cemented to the underside of the motor stick in the position shown, the straight rear edge of the front block 5-1/16" from the front of the framestick, and the straight front edge of the rear block 1-3/8" back of this. Hold them in place with pins until dry.

The propeller shaft next is inserted in the hole in the propeller hub from rear to front (convex sides of blades facing forward). Bend over the front end of the shaft into a narrow "U" and drive it back into the propeller hub to anchor it securely: cover the end with cement.

Then after slipping two or three washers over the rear end of the shaft, hook it through the bearing on the stick.

Making the wing is the next step. If made of balsa, cut it from 1/16" light sheet according to the dotted outline on the drawings: hardwood should be only 1/32" thick. The solid lines show its width when curved with ribs in place. When the center block is cut with properly "Veed" underside, crease the wing sheet at the center with a dull edged instrumnt, and cement the block in place holding it tight with a weight while both wing tips are raised 1-7/8" as in Fig. 87. The small diagram shows how the dihedral block fits in place. Next cement the elevation block in place as shown at the *rear* of the dihedral block. Cut out the ribs while joints are drying.

If the wing is of balsa, use the rib pattern prescribed for this material; if it is made of hardwood use the ribs shown for a double surface wing (for hardwood). Only two ribs on a side are needed for balsa, but three for hardwood wings from which panels are cut out for lightening as indicated.

When all joints are dry, cement the ribs in place, holding them until dry with pins, weights or clamps. This completes the balsa wing and it then may be attached to the frame in the position shown, with rubber bands.

Hardwood wings must be covered with tissue paper *top* and bottom. Proceed by covering one side of one half wing at a time, trimming off the rough edges.

When the wing is in place on the plane string the rubber strand motor between propeller and tail hooks, allowing just a semblance of sag at the middle: the strands should not be stretched tight. Four strands or two loops of 1/8" flat rubber is needed for a balsa plane, six strands for hardwood. Tie the ends of the strands securely with a square knot.

At this moment most models are wrecked by attempts to fly them without careful adjustment. Try gliding if you are impatient, but wait for flight instruction in next month's article, unless you are experienced.

HAPPY LANDINGS.

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See page 55

Devil Diver

(Continued from page 23)

The ship was an instant success and quantity orders were fulfilled for the Marine Corps in 1936 and 1937. The perforated flap was featured on this plane and the first "dive-brakes" were experimented with. With the absorption of the Northrop firm by Douglas Aircraft, Inc., in 1938, the BT-1 was modified to incorporate a fully retractable landing gear and re-designated the SBD-1. Due to the "multi-cellular" type wing construction originated by John K. Northrop, it was impractical to retract the gear completely but the leading edge of the inner wing was swept forward into the fuselage, affording a recess for the gear. The ship was further improved in the SBD-2 and quantity orders for the SBD-3 were fulfilled for the Navy and Marine Corps. Late in 1939 the Army became interested in the plane and purchased a small quantity

under the designation A-24. Tests proved so satisfactory that larger orders were awarded and the A-24 is now in extensive production. The SBD-3 and the A-24 are identical with exception of the removal of deck-arresting gear and substitution of a higher tail gear on the Army model, together with various types of internal equipment peculiar to the individual services. Both have come to be known as the Dauntless, our Plane on the Cover this month.

Dive bombing is one of the most highly-publicised but least known battle tactics now being used and the public has been "ballyhooed" into a gross misconception of its technique. Dive bombing consists, essentially, of an airplane carrying a bomb which it releases while in a steep dive. Its primary use is against moving targets such as motorized troop columns on land and ships at sea. It is neither as accurate nor as deadly as high-altitude level bombing against stationary land targets (MODEL AIRPLANE NEWS March 1942 issue) and for this reason it has been developed by and is primarily used in the Navy. A typical dive bombing attack begins at around 10,000 feet where the dive bomber has rendezvoused above and considerably aft of its target. When everything is in readiness the dive-brakes are opened. These devices are any of a series of panels which are opened against the slipstream *prior* to the start of the dive. Should they be opened at the mid-point of the dive when the airplane is traveling at a high rate of speed they would be ripped from the wing by the pressure. They are used to limit the airplane's speed causing it to fall at a speed no greater than a fair degree of accuracy and control warrants. The plane is nosed down easily and the dive is gradually steepened to about 75 degrees, never more than this. The mighty 90 degree "death-dive" popularized in fiction and the movies is non-existent in practice as it destroys accuracy, increases the plane's speed uncontrollably and makes the pull-out exceedingly dangerous and difficult. The pilot picks up the target in his sight and adjusts his course, changes in direction being made almost entirely with ailerons rather than rudder.

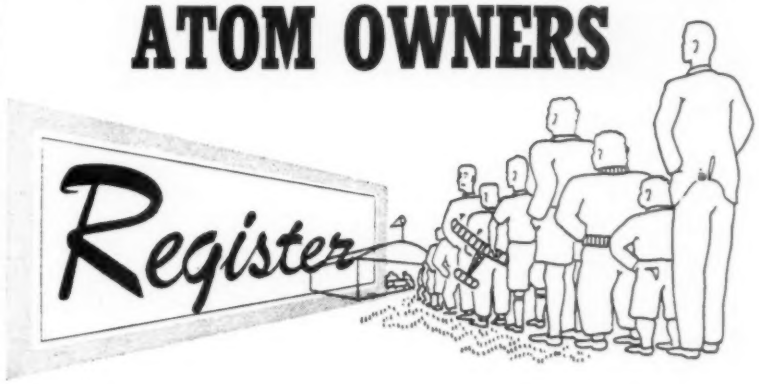
The dive lasts no longer than 15 seconds as longer dives affords the enemy's gunners ample time to set their gunsights and time their shell fuzes. At approximately 2,500 feet pull-out is begun and the bomb is released. It is important that the bomb be released *after* start of the pull-out, for were it to be released prior it would immediately curve down due to its weight and wind resistance and fall off of the straight path to the target indicated by the line of the plane's flight. It is the release of the bomb that is the vital factor in dive bombing and only skilled pilots can execute repeated scores in this maneuver. The pull-out must be made between two extremes: a swift pull-out which would quickly build up the airload on the airplane structure past the designed load factors and shear the wings off, and a slow pull-out which might send the plane into the ground, water or target before level flight had been reached. The pull-out must be gentle but firm and must not exert an acceleration greater than 4-6 "g's" on the plane or crew.

The "black-out" danger line is 6 "g" and an 8 "g" pull-out may result in temporary injury to vital body organs. Maximum pull-out acceleration ever survived by a pilot is believed to be a 10 "g" dive by Lee Gehlbach in a Navy torpedo-plane of the now defunct Great Lakes Aircraft Co. Test Pilot James Collins of the Grumman Aircraft Company lost his life in a 12 "g" pull-out of the first experimental Grumman single-seat fighter when the wings sheared from the plane, leaving the indicator frozen at this prodigious figure.

The pull-out need not be done hurriedly and the high rate of speed of the dive bomber will very quickly carry it out of range, a fast climb and get-away not being necessary. For this reason a 4 "g" pull-out is considered normal under favorable conditions and this will allow the gunner to get in a few shots and get a good view of the damage done.

Several types of bombs are used for such missions, largest of which is the 1,000 pound type which can easily destroy a vessel up to 10,000 tons displacement without

ATOM OWNERS



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armor protection if accurately placed. Larger bombs have not been used because there are no planes capable of making effective use of them and because they are not necessary for attacks against enemy ships of the size, or smaller, mentioned above. Dive bombers normally operate in quantity and a five-ship attack in which each bomb scores a hit will disable even the largest battleship and leave it prey for torpedo bombers which normally follow dive bombers.

The 550-pound bomb is the most flexible type. Two of these can normally be carried permitting a second attack if the first registers a miss, and a dive bomber with a single 550-pound bomb left in its racks is still quite maneuverable and on several occasions in the South Pacific enemy fighters have been shot down in combat by dive bombers carrying a remaining 550-pound bomb. A series of 100-pound bombs can be carried for attacks against the deck installations and personnel of enemy cruisers, destroyers or carriers and can be used effectively for pattern bombing when the attack is made beam-wise of the enemy ship.

Outstanding plane in all the world in this category now in action is the Douglas Dauntless, a sturdy, proved, conventional type which has single-handedly destroyed more tons of enemy shipping than all other types of all other nations combined, according to a recent statement from the Navy Department.

Fuselage is monocoque construction consisting of a series of channel-frames connected by extruded angle stringers covered with riveted 24ST Alclad sheet plating. Wings are the noted "multi-cellular" construction in which a large number of box-like cells are formed by a number of webs and ribs intersecting in riveted joints. This "honeycomb" affair is covered with Alclad sheet making it a truly stressed-skin rigid structure of the strongest type. Now no longer in favor, it has lost its popularity due to lack of internal access for fuel or oil tanks, landing gear, bomb racks or satisfactory access for controls cables or repair work. The ailerons are metal structure, fabric covered, the left aileron being fitted with a trimming tab controllable, while in flight, from the cockpit.

The tail surfaces are metal structure with stabilizers sheet covered and the rudder and elevators fabric covered. These latter are equipped with trimming tabs controllable by the pilot.

The landing gear is the single-strut type, shock struts being mounted on a knuckle forging which rotates inward about its shaft fitted to the front web, folding the wheel into coverings formed by an extension of the leading edge from the wing joint forward and inward to the fuselage, the wheel lying completely forward of the front web in the retracted position. The tail wheel is the fixed type, the SBD-3 Navy type having a solid rubber, thin tire rigidly mounted to the wheel; the A-24 Army version having a larger and higher support and a conventional air-inflated tire.

The Dauntless is powered by a Wright Cyclone SGR-1820-32 nine-cylinder, single-row radial air-cooled engine with a rated horsepower of 950 hp. @ 2300 r.p.m. Maximum takeoff power is 1,000 hp. @ 2350 r.p.m. and the engine develops 800 hp. at 16,000 feet. It mounts a Hamilton Standard three-bladed Hydromatic full-feathering propeller which, in the Navy version, is fitted with a rubberized anti-icing nose spinner.

Fuel is carried in four tanks mounted within the inner-wing section which is bolted to the fittings provided on the fuselage. Total fuel capacity is 310 gallons.

Oil is carried in a single tank mounted in the upper portion of the powerplant compartment against the forward face of the firewall. Total oil capacity is 15.5 gallons.

The engine is completely enclosed in an N.A.C.A. cowling which is quickly removable for servicing and which is fitted with six flap panels mounted on each upper quadrant used for cooling the engine on the ground and during climbs. The carburetor air is taken in from the bottom of the cowling through an adjustable scoop and routed upwards to the conventional "up-draft" carburetor, a type no longer used. The engine is equipped with a two-speed blower for supercharging giving the Dauntless a higher ceiling than equivalent types, it being capable of flying and fighting at more than 25,000 feet.

The trailing edge of the wing is equipped with a device which is peculiar to the Dauntless and which has identified it since its inception. The flap panels are of the "perforated" type in that a large number of holes have been incorporated into both upper and lower surfaces. The purpose of these holes is to permit the airstream to pass by to the tail surfaces with the flaps in extended position, thereby assuring adequate pitch control of the airplane and eliminate the possibility of "buffeting" of these surfaces, thus destroying their effectiveness. Actually there are two sets of panels, the lower set only being lowered to serve as a flap, the upper set only being raised to serve as a spoiler and both being extended to serve as diving brakes. This device has, possibly more than any other feature, permitted the Dauntless to become the deadly dive bomber it has by assuring the pilot perfect control of his plane at all times, a feature not found on other dive bombers particularly the notoriously awkward German Stuka.

Armament aboard the Dauntless consists of two .50-caliber machine-guns synchronized to fire through the propeller from their mounting atop the fuselage forward of the pilot. These guns have rung up a high score of enemy fighters, particularly the Japanese Zero (MODEL AIRPLANE NEWS, January 1943 issue) which has been the chief foe of our carrier-operated dive bomb-

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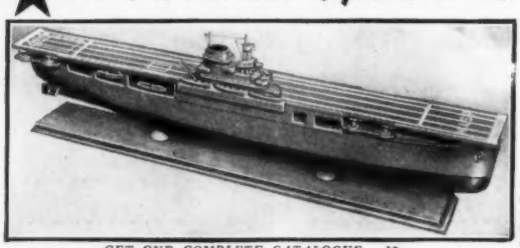

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ers in the Pacific. A single .30-caliber weapon is mounted on a swivel trunnion aft of the rear cockpit for use of the radio-operator-gunner and this gun, too, has been used effectively for close-range work.

The Dauntless carries a 500 pound bomb in a special displacement gear mounted beneath the fuselage which hinges at the forward portion permitting the yoke to drop forward and down thereby thrusting the bomb away from the propeller arc. In addition, wing racks are fitted which carry smaller bombs.

The Dauntless has a wingspan of 41 ft. 7 in., is 32 ft. long. It has a wing area of 324 sq. ft. and stands 13 ft. high in the three-point position with a blade of the propeller vertical. The propeller has a diameter of 10 ft. 9 in.

It weighs 5,570 lb. empty and has a gross weight of 8,197 lb. This weight gives the airplane a wing loading of 25.3 lb. per sq. and a power loading of 8.20 lb. per hp.

The Dauntless has a top speed at engine rated altitude of 260 mph. and a cruising speed of 210 mph., putting it way out in front of any of the world's dive bombers. It has a stalling speed of 72.5 mph., and a range of approximately 1,000 miles.

A total of about 400 Dauntless dive bombers were procured by the Navy in the SBD-1, SBD-2 and SBD-3 series from 1938 through 1940 at which time the production of the type was devoted to the Army A-24 version. These Navy models have seen service aboard the carriers since Pearl Harbor and have received official commendation for their valiant service.

Soon to be replaced by the powerful Curtiss SB2C-1 (MODEL AIRPLANE NEWS, July 1941 issue) dive bomber, the Dauntless has earned its place in aviation's hall of fame and it can be said in all honesty that the entire picture of the Pacific strategy might have been changed had not these deadly dive bombers been in constant action throughout the many victorious campaigns of the U. S. Navy.

VICTORY

Submarine Smashers

(Continued from page 7)

carefully planned sequence of operations. The airplane master switch must be "ON" for some checks, "OFF" for others, and pity the radio man were he to attempt to change a tube when the set was "ON" with 650 *volts* coursing through it!

The Flight Chief inspects the Flight Report to determine the exact status of the airplane, how many total flying hours, how many hours were flown the previous day, how many engine hours and how many are left before the next major overhaul necessitating an engine change, how many propeller hours (propellers are changed and overhauled at frequent intervals just as engines are) and notes whether are not any items have been reported malfunctioning during the previous patrol.

The airplane fuel tanks are normally filled at night prior to bedding it down in the hangar because a full fuel tank does not collect moisture with its accompanying danger of water in the gasoline like an empty or partially empty tank does. However the fuel cocks are opened momentarily to drain out any water or sediment that might have collected. The oil level is checked and the tanks filled if required. Irrespective of how far the airplane is going or how long it is *planned* to be gone, the fuel and oil tanks are completely filled before the airplane leaves the ground. Should anything unexpected turn up such as an unplanned chase, heavy head-winds or a leak appear in a tank or line, the pilot can count on full tanks in calculating his range.

The electrical engineer turns on the master switch and checks to see that all position, identification, navigation, landing and warning lights are operating. The battery is checked for hydrometer reading and filled with water. (Acid is *never* added to an airplane battery while in service.) If the airplane voltmeter or ammeter has been registering low, he removes the generator and checks the brush clearances, replacing those that are worn. Radio dynamotors are checked for loose connections and worn brushes, the airplane wiring conduits are checked for tightness of connection and all bonding strips are inspected closely for security of attachment. Checks are made in the Airplane Inspection Record as each check is made.

The hydraulics engineer checks the hydraulic pumps mounted on the engine accessory drive pad for leaks or looseness. He fills the fluid reservoir with hydraulic fluid and inflates the pressure accumulator with air to the required pressure. This accumulator insures hydraulic pressure for several movements in emergency. He carefully inspects the landing gear, nose wheel, flaps, oil cooler doors, engine cowl flaps, carburetor heat door and bomb-bay door actuating cylinders for evidence of leaks and replaces the packing in those found faulty.

The instrument technician checks each instrument to insure its zero setting and that all instruments are tightened, that the rubber shock mounts of the instrument panel are not deteriorated and that all instrument lines and fittings are tight. He winds and sets the clock, sets the altimeter to either the station altitude, sea level, or as requested by the pilot (individual pilots have different opinions on the zero setting of the altimeter), and checks the automatic pilot for evidence of leakage or damage.

The radio serviceman turns on the sets and checks with the control tower to insure proper reception and transmission. Various frequencies and bands are tested and for this purpose it may be necessary for him to communicate with stations a hundred miles away. He makes certain, however, before beginning his check that no metallic objects are within one foot of the ship's antenna, otherwise sparks may fly and an explosion occur. If any faults have been reported in the interphone set, switch or control boxes, antenna relays, amplifiers, filters or the transmitters or receivers themselves, he replaces the units and repairs the malfunctioning sets after the airplane has left on patrol.

The engine mechanic removes all the powerplant cowling and carefully inspects the engine for loose push rods or rocker box covers, burned-out spark plug elbows, evidence of leakage from any accessory drives, security of mounting of all accessories, checks all engine controls rods or

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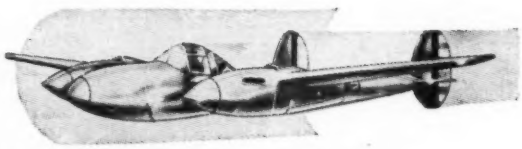

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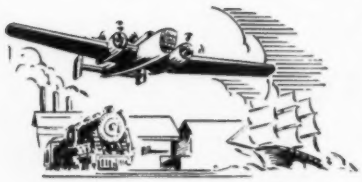

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cables for freedom of movement and evidence of looseness or end play and examines the propeller closely for scratches, dents or nicks. If necessary, the entire powerplant unit may be removed from the airplane and a complete new assembly installed in less than 30 minutes. The use of "demountable" powerplant, in which the engine mount supports the engine and all accessories, lines and fittings as a self-contained unit, has speeded engine-change time 1000% and efforts are now being made to design powerplants capable of being interchanged between different types of airplanes!

The airplane mechanic is the jack-of-all-trades and master of each of them and to him falls the huge job of ascertaining that the plane itself is in tip-top shape. He must fill the landing gear shock struts, inflate the tires to the deflection markers provided for the purpose, remove each access and inspection door (there are frequently more than 100 on large bombers) and ascertain that control cables, hinge fittings and bolts, conduit and lines are securely attached.

The armament engineer opens the bomb doors and carefully inspects the operation of the bomb locking and releasing gear and ascertains that the proper sequence of release will be maintained. He removes the unfired ammunition from the gun turret ammunition boxes and fills them to capacity with complete belts. He checks gun sights and the operation of the power driven turret to see that it follows the sights in azimuth and elevation. He reloads and checks the gun-sight aiming point camera which keeps a photographic record of every fifty caliber bullet fired. The film is developed and shown immediately following landing, presenting an undeniable confirmation of claims of damage to enemy planes or vessels.

The Flight Chief supervises all of these inspections and makes many of his own and records all findings in the Maintenance Inspection Form. Various marks indicate whether or not a condition renders the airplane unsafe for flight, conditionally released for flight or completely "okay!"

The bomb load is trundled out to the airplane following the engine ground warm-up (which serves to observe and check the engine, fuel and oil systems, hydraulic systems, electrical systems and the engine instruments). Following this the engines are

shut down for the bomb loading, as warming the engines with the bomb load installed entails taking unnecessary risks with backfires, subsequent danger of fires and explosion.

The bombs are quite harmless in the "safe" condition but, nevertheless, they are handled as tenderly as a baby, for whether or not their fuses are in the "safe" condition, nobody would toss a hundred pounds of T.N.T. back and forth! The smaller bombs are normally loaded by hand but for larger bombs each airplane is fitted with a special bomb hoist built into the bomb bay. This consists of a swinging tee and a power-driven hoist (connected to a ground source to save battery energy) and a cable cradle into which the bomb fits as it is hoisted into the belly. The bomb is first fitted with an adapter, which is actually the release mechanism. After begin raised into position the adapter is locked into the rack and the bomb way braces fitted to prevent them from swinging about inside the bay. The release wire is attached and the fuse is screwed into the nose of the bomb and turned to the "armed" position. The big depth charges are hoisted into position in their special racks. These are large cylindrical objects flat on each end.

The pilots and plane crew have now filed into the briefing room where the plans for the day are unfolded. Each airplane is given a particular region to patrol usually marked off at the inshore end by coast guard or Naval patrol vessels which will be available to rescue survivors of torpedoed cargo ships, submarine crew, or the airplane crew should some mishap arise. The signal codes, frequency wave-lengths and time-intervals of communication for the flights are arranged so that a complete moving chart may be kept throughout the patrol by the control board at the base.

The pilots are told of the approximate location of enemy vessels, their course, speed and anticipated location over an area at stated intervals. Complete reports are given of Allied and U.S. shipping in the vicinity together with course and speed. From these, charts are worked out showing possible points of interception which must, of necessity be a general region, often with a radius of 200 or 300 miles since the submarine may have headed in any of 360 degrees after its last reported appearance.

Those crews which will remain on the alert are also in the conference so that the instant an alert is sounded they will know the approximate location of trouble and therefore not require a complete report prior to takeoff. One man of each crew on the alert squad must be assigned the duty of keeping a constant check on the patrol throughout the day so that he can issue orders to the pilot after the ship has gotten into the air.

The report from the field is received stating the numbers and types of bombs and ammunition aboard and that the airplanes are prepared and ready for release to the pilots. The patrol crews file out, grab a last-minute cup of coffee and a smoke and enter their planes. They are released from the field in a predetermined sequence by the Control Tower and the bombers head for their respective patrol areas. These patrols remain always in sight of one another although they may fly 40 or 50 miles apart.

PLANE TALK SKYWAY FUN WITH A FUTURE! FREE POSTAGE ON ALL U. S. A. ORDERS

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18" Strips
SELECT, HARD STOCK
1/16 sq.....15, 5c
1/16x1/4 10 for 5c
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1/16x1/4 5 for 5c
3/32 sq. 10, 5c
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1/4x1/2 2 for 5c
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3" & 36" cost twice 18"; 3x36, 5 times.

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MACHINE GUNS
3/4"....3c, 1 1/4"....5c
1 1/2" Lewis.....6c
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1 1/4" Ring Mt. 15c
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3/4" .....each 3c
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Sheets, 4 times 18".

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2x3 .....50c
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3x6 .....1.50

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1 1/2" 10c, 2" 15c
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Large Size, 2 Jars $1.25
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Prop Shafts, doz. sm. 6c, lge....10c
Nose Plugsfor5c, 1/2"—5, 3/4"—4, 1"—3.
Plywood—1/16: 1/8: 3/16: 1/4: 40c ft.

Note: If war regulations make it necessary, we reserve the right to make substitutions.

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Easiest-to-work-with! Safest! Equally efficient on delicate or heavy-duty projects! Refills in a jiffy! Knife with double edge blade 10c at dealers (By mail: 15c). Extra blades 2 for 10c; Knife with blade plus 2 extra blades 25c postpaid.

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New Edition, 528 pages, 205 diagrams & plans. Basic trainer for Aviation Career. Shows how to produce consistently fine, flying models..... $3.75

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Full size instrument panel with movable dials, full size "joy" stick for control manipulations; complete Kit includes 30 page illustrated instruction book and instructions for plane identification. (BY MAIL: Add postage to your zone!)

CEMENT
CLEAR DOPE THINNER
Banana Oil
1 oz. 8c, 1/2 pt. 40c
2 oz. 15c, pint 65c
Colored Dope
1 oz. 8c, 2oz. 15c
1/2 pt. 50c, pt. 75c

MICROFILM RUBBER LUBE WOOD FILLER LIQ. CELLULOID
1 oz. 9c 2 oz. 15c
1/2 pt. 50c, pt. 75c
Plastic Balsa 4oz.29c; tube 10c

Dowels
1/16"x12" .....4 for 5c
1/8"x18" .....2 for 5c
3/16"x18" ea. 5c
1/4"x18" each 5c
12" Bamboo
1/16"x1/4" .....doz. 5c

Reed, 3 ft. length
1/32-1/16-1/8 .....doz. 5c
Brass Bushings
1/16" or 1/8" .....doz. 5c
Gas model 3 for 8c

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SHIPPING INSTRUCTIONS: Add 5c for insurance to assure safe delivery. Packing cost on all orders 10c. 36 or 5 ft. 20c. If outside 48 States also add 15c postage when order is over $1 and 15c if under $1. Minimum order—80c. No. C.O.D.

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Champion Spark Plugs 3/8 or 1/4 50c
Plugs & Jacks, per set.....35c
Battery Boxes, Sm. Med.....40c
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Condensers, best qual. 20c; Metal 35c
Terminal Clips 5/8" 10c val. 3— 5c
Spaghetti Tubing 1/16" 3 ft.—10c
Toggle Switch 35c. Lightweight 25c
SAE 70 oil—1/2 pt. 25c. Pint....45c
12" High Tension Leads—Best....15c
Best Quality H.T. leadwire, 3 ft...10c
Booster Leads, 75c value, pair....50c
Solid DURAL Spinner, Small, Lge. 25c
Masking tape—1/4"x36"—Instruc. 5c
Alligator Clips—Solderless.....10c
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Gas Model Silk
H'vy qual. 75c yd.
BROWN RUB'R
Bands 1/4 x8" ea. 2c

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1 1/4, 1 1/2—45c
1 3/4, 2—55c
2 1/4, 2 3/4—66c
Gas Mod. 2 3/4-1.10
3-1.40—3 1/4-1.65
4 1/2-1.95

M&M WHEELS
1 1/4, 1 1/2, 1 3/4 60c
1 3/4, 2 2 3/4 70c
Gas Mod. 2 3/4 $1
Flywheel " 85c

STREAMLINE Sponge Rubber
Wheels (per pair)
2" 40c; 2 1/2" 50c; 3" 60c.

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Balsa Paulo Ritz Wing Gas
5" 4c-10c Mod.
6" 5c-10c 8" 40c
7" 6c-15c 9" 40c
8" 7c-17c10" 40c
9" 8c-21c11" 40c
10" 9c-25c12" 40c
12"10c-30c13" 40c
14"12c-50c14" 60c
15"15c-60c15" 50c
16"16c-50c16" 50c
18"25c1.25 18" 75c

RITZ Gumwood
8"9"10"11" 20c ea.
12"13"14" 20c ea.

PROPELLER BLOCKS
1/2x 3/4x 5 4—5c
1/2x 3/4x 6 3—5c
3/4x1 x 8 2—5c
3/4x1 1/4x10 3c ea.
3/4 x1 1/4x12 4c ea.
1 x1 1/2x12 6c ea.
1 x1 1/2x15 9c ea.

Thrust Bearings
1/2 doz. Sm. 8c
1/2 doz. Lge. 12c

ALUM. TUB'G per ft.
1/16 .....10c
3/32, 1/8 .....10c
3/16, 1/4 .....15c
Sheet Alum. 1/2 ft.
.003-.005 ....25c
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1/2x1/2 ft. 20c
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Alum. Foil 6" Roll 6" wide
Perfect for covering metal surface of plane, etc. 15c

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.014 .....3 ft. 2c
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.049 .....4 ft. 6c
1/16" .....3 ft. 6c
3/32"....2 ft. 10c
1/8" .....2 ft. 15c

'U' CONTROL WIRE spools!
100' 65c; 50' 40c

Wing-Tail Light (Set of 3) 5/16 8c
9/1610c, 11/1612c

DIE CAST PROPS
2 Blade 3 Blade
1 1/4" .....5c— 8c
2 " .....5c— 8c
2 1/2" .....7c—10c
3 " .....10c—15c
3 1/2" .....10c—15c
4 " .....20c—25c
Spinner Type
1"....5c; 2"....10c
3" oversize....20c

SKYWAY MODEL AIRCRAFT SUPPLY CO., 426 SIXTH AVE., DEPT. M. BROOKLYN, N. Y.

Contact is made with the home station and other airplanes and the patrol commences.

In the air, each member of the crew busies himself with his own duties for the first half-hour, each man adjusting his equipment, making minor corrections and readying himself for action. The bombardier in the nose, who has complete charge of the bombsight and which he, alone, sees, handles or carries in the air or on the ground. He adjusts his sight for airspeed, altitude, drift and the type of bomb to be dropped and makes changes in these settings at timed intervals thereby making only instant adjustments necessary when the time for action comes.

The pilot sets his course, checks his flight instruments, sets his control tab wheels at frequent intervals to compensate for the consumption of fuel, wind changes, engine speed, etc. The co-pilot makes a mental note of these conditions so that he may be prepared to take over the controls at a moment's notice without orders or instructions from the pilot.

The upper turret gunner checks his guns and sights, adjusts his seat and foot grips and fires a few rounds to clear his guns. He is the primary lookout and must keep his turret revolving throughout the flight signaling out minute objects on the sea's surface, checking and re-checking with the bombardier, pilot, co-pilot and belly gunner for confirmation or a jovial crack about his eyesight as the case may be. Each man has the same primary mission to perform at sea on patrol: keep a sharp lookout for subs! All other assignments are secondary and each man's eyes is glued to the sea throughout the patrol. Constant exchanges of conversation are made through the interphone to check the appearance of something on the sea's surface.

The navigator normally has his hands full throughout the flight but is constantly on the alert to jump to one of the turret guns when required. He keeps a constant check on the airplane's course, speed and location and also keeps a record of all vessels sighted below which are radioed into headquarters for confirmation and recognition. There is little need for radio silence as submarines cannot send or receive messages while submerged.

When word is received that a bomber has sighted a sub, only those ships so ordered head for the area, the others maintaining their patrol. Subs hunt in packs

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in the Atlantic and where there's one there's every probability there is another, perhaps three or four in the general region.

When assurances have been given that a submarine has been sighted and a verified re-check shows no U.S. or Allied subs in the region, the bomb doors are opened, the plane is set in a dive and the control of the airplane's flight attitude, speed and direction is given over to the bombardier. The ship is leveled out and the run is made down the target. The bombardier, his eyes glued to the set, his hand on the release mechanism, mutters instructions to the pilot and at the precise moment, presses the release and the bomb is released. The airplane is hurriedly swung about while the belly gunner crawls into the tail of the ship and shoots the scene below in his camera. A second run is made and a second bomb is released. The airplane then turns in a tight circle and circles the spot—all eyes on the water for signs of debris. For a few minutes everyone waits while the plane circles, waits for the sub to surface. A sub commander will invariably surface following a depth charge attack; he would much rather fight it out on the surface than die in a crushing grave below.

The instant the sub breaks the surface the bomber is on him dropping its demolition bombs at the direction of the bombardier. When the conning tower is broken open and the crewmen hurry towards the deck gun, the upper and lower turrets of the bomber come to life spraying the sub's decks with a hail of lead. The battle continues until the sub is sunk, it surrenders or the airplane's ammunition and bomb load are exhausted. If the submarine chooses to surrender, radio messages are flashed to the nearest Coast Guard or Navy patrol vessel and the bomber keeps vigilance overhead, firing several rounds of ammunition from time to time when anything untoward happens below.

When an enemy U-boat is sunk the word is flashed to the home base and nothing is too good for the crew when they return to celebrate their victory. But the B-25 is immediately serviced and inspected as previously outlined and the entire careful, microscopic routine is begun again preparatory to the next day's attack.

The chore of the Bomber Command's Anti-Submarine Command is back-breaking toil requiring all the stamina, patience and knowledge a normal man possesses in the day-to-day routine of submarine smashing. Each man, from the lowest private to the commanding general, plays his part in this campaign and to no one individual will go the credit for opening the pathway to victory across the Atlantic. Perhaps even the patrol itself will garner little credit when the Battle of Europe breaks out in all its hellish might. But each man will know he has done a vital job, played a singular role, and won an individual victory when the last Nazi Swastika has come down from Europe's mastheads and free peoples everywhere will throw off Hitler's yoke and rejoice in liberty.

VICTORY

Send your original designs for airplanes to The Airplane Design Forum for criticism and advice. (See page 27)

6 New Flying Models

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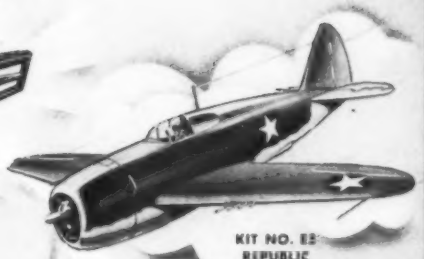

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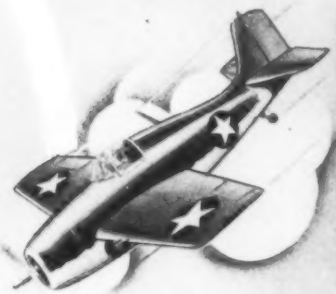

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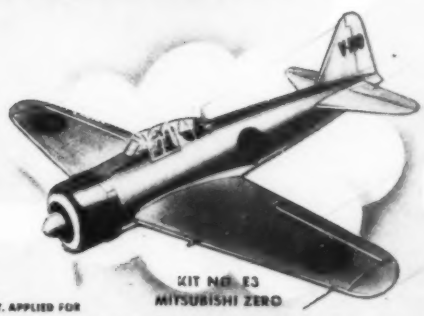

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Ohlsson and Rice craftsmen are doing very well on Field Ration "K". And from what we hear, the men of the fighting forces would like them to stay right where they are.

Modelers! Keep 'em flying! Protect your motor by sending it to the factory for a check-up—$1.00—and replacements as needed. New Ohlssons are still available at many dealers. Illustrated folder on request.

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